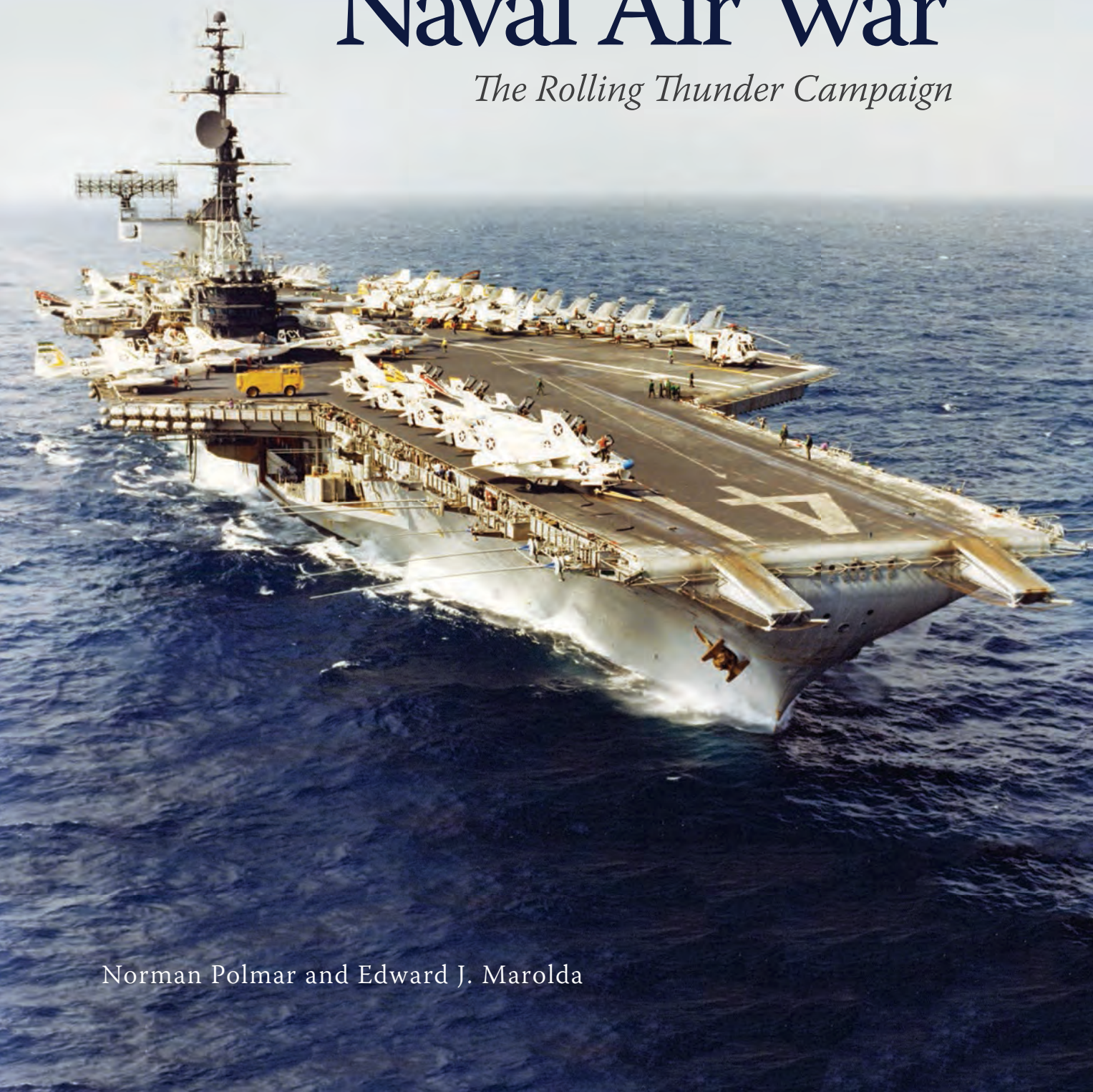
Naval Air War

The Rolling Thunder Campaign



Norman Polmar and Edward J. Marolda

Front cover: *Midway* (CVA-41), a veteran of Operation Rolling Thunder and longtime defender of U.S. interests in the Western Pacific. NHHC VN Collection

THE U.S. NAVY AND THE VIETNAM WAR

Edward J. Marolda and Sandra J. Doyle, *Series Editors*

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The Rolling Thunder Campaign

Norman Polmar and Edward J. Marolda

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Architects of defeat. Left to right, U.S. Ambassador to the Republic of Vietnam Maxwell D. Taylor, Secretary of State Dean Rusk, President Lyndon B. Johnson, and Secretary of Defense Robert S. McNamara.

INTRODUCTION

The U.S. Navy and Marine Corps strongly influenced the conduct and outcome of the Vietnam War. Naval aviation—Navy and Marine Corps—figured prominently in air operations against the Democratic Republic of Vietnam (North Vietnam) and Communist forces in Laos, and in support of U.S. and allied troops fighting in the Republic of Vietnam (South Vietnam).

President Lyndon B. Johnson ordered the March 1965 bombing campaign against North Vietnam—Operation Rolling Thunder—to discourage the Hanoi regime's direction and support of an insurgency that threatened to destroy the Republic of Vietnam. Bombing operations during 1964 in Laos, through which passed the main enemy supply line to South Vietnam—the Ho Chi Minh Trail—had failed to curtail or even slow Hanoi's war effort. The U.S.-sponsored Operation 34 Alpha, a clandestine maritime campaign of sabotage and naval bombardment along the coast of North Vietnam, had proven even less successful. Indeed, the attack by North Vietnamese torpedo boats on destroyer *Maddox* (DD-731) in August 1964, and the killing of U.S. servicemen by Viet Cong guerrillas at bases in Bien Hoa, Saigon, Pleiku, and Qui Nhon in South Vietnam in late 1964 and early 1965, demonstrated the enemy's determination to stay the course. One-time U.S. strikes against targets in North Vietnam in retaliation for these attacks failed to alter the enemy's long-term plan to unite all of Vietnam under Ho Chi Minh's Communist regime.

The Johnson administration decided that a concerted bombing campaign could convince North Vietnam's leaders that they would pay too high a price to achieve their goal. Washington concluded that allied air forces operating from bases in South Vietnam, Thailand, and aircraft carriers in the Gulf of Tonkin could accomplish this mission without provoking intervention into the war by North Vietnam's nuclear-armed allies, the Soviet Union and the People's Republic of China. As retired Air Force officer Dennis M. Drew observed in his monograph *Rolling Thunder 1965: Anatomy of a Failure*, "The overriding fear was that the Chinese would intervene directly if the United States began intense military operations in Vietnam, particularly if the United States assaulted North Vietnam. The memories of the Korean conflict and the Chinese assault across the Yalu River remained fresh in the minds of the American leadership in 1965."

Confident in the political science conflict theories of "flexible response" and "graduated escalation," all the rage in Washington during the early 1960s, U.S. leaders drew a bombing line across the southern part of North Vietnam and envisioned "rolling" the line of "thunder" very slowly northward. They believed that as the bombing moved closer to Hanoi, the Ho Chi Minh government would capitulate to save the country from massive destruction. U.S. Navy and U.S. Air Force operational planners initially focused on 94 targets that included bridges and railways, military installations, and industrial sites in North Vietnam. The Joint Chiefs of Staff selected these targets months prior to the start of the campaign, and the White House approved some of them.

Operation Rolling Thunder would become one of the longest sustained aerial bombing campaigns in history. *And it would be a failure.* Those responsible for that failure included President Johnson, Secretary of Defense Robert S. McNamara, the Washington-based national security/intelligence establishment, and the senior U.S. military commanders in Asia.

In early 1965, few American civilian or military leaders believed that North Vietnam had the will or capacity to resist the bombing campaign. When it became clear that the U.S. strategic analysis had erred on both counts, American leaders parted ways on how to proceed. Some but not all members of the Joint Chiefs of Staff and other military leaders advocated an overwhelming,

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An RF-8A Crusader aerial reconnaissance plane of Light Photographic Squadron 63, involved in air operations in Laos during December 1964, flies over carrier *Ticonderoga* (CVA-14).

no-holds-barred air assault on North Vietnam to achieve victory. President Johnson, however, feared that a major war in Southeast Asia would derail his Great Society and other domestic programs. Secretary McNamara persuaded the President that a judicious, carefully controlled application of military force would bring success as it had in the Cuban Missile Crisis of 1962. Both men believed they could compel Hanoi to give up the fight through military pressure and diplomacy without triggering Chinese or Soviet intervention.

Admiral Ulysses S. Grant Sharp Jr., Commander in Chief, U.S. Pacific Command (CINCPAC), who was the commander directing the Rolling Thunder campaign, initially tried to steer a middle course. He pushed for powerful military strikes, but in his bombing plans he accommodated Washington's wishes to avoid provoking Hanoi's allies or arousing war fever in the United States. By the end of Rolling Thunder, however, Sharp's often heated advocacy of strong measures, including the mining of North Vietnam's ports and the destruction of all major

military targets, had negated his influence with Johnson and McNamara.

The admiral especially loathed Washington's micromanagement of operations. President Johnson once boasted that the military could not "bomb an outhouse without my permission." Significant technological improvements in military communications since the Korean War enabled President Johnson, unlike his predecessors, to exercise direct control of military operations thousands of miles from Washington. He often selected targets to be struck in North Vietnam at Tuesday luncheons in the White House. McNamara and his civilian deputies not only dictated which targets could be struck but at times stipulated specific days and times for attacks, the number and types of aircraft to be employed, and the kinds of ordnance to be used. Vice Admiral Malcolm "Chris" Cagle, a noted naval aviator, likened this unwieldy process to "targeting by remote control."

While constrained by the tight control of operations from afar, the Navy, Marine Corps, and Air Force officers charged with executing Rolling Thunder adapted as best they could and brought significant airpower to bear against enemy forces in North Vietnam, Laos, and South Vietnam. The bombing campaign failed to compel Hanoi's surrender or to cut the Ho Chi Minh Trail, but Rolling Thunder operations did force North Vietnam to pay a heavy price in terms of lost lives; destroyed roads, railways, bridges, and power generating plants; and a devastated economy. The American air forces also saved the lives of thousands of allied soldiers and Marines fighting in South Vietnam by delaying the start of enemy offensives and starving them of supplies and reinforcements.

The U.S. Navy proved essential to the conduct of Rolling Thunder. Exploiting the inherent flexibility and mobility of naval forces, the Seventh Fleet operated with impunity for three years off the coast of North Vietnam. With existing airfields under attack and new, jet-capable airfields under construction in South Vietnam during the early years, Task Force 77 carriers complemented the Air Force's air support responsibilities. Cruisers, destroyers, frigates, and for a period in 1968 the battleship *New Jersey* (BB-62) shelled targets along the North Vietnamese coast. Other warships, with advanced radars, monitored the skies over North Vietnam to warn U.S. aircraft of approaching enemy planes. Naval replenishment ships enabled the fleet to remain off Vietnam night and day, seven days a week throughout Rolling Thunder.

Nonetheless, the Navy that entered the fight in Vietnam did so with many ships, aircraft, weapons, and equipment that first saw service in the Korean War, or even World War II, and with tactics inadequate for aerial warfare in the 1960s. The Navy overcame those deficiencies with the development and testing in battle of advanced aircraft, munitions, and electronic gear. Naval officials, combat commanders, and enlisted personnel learned in the hard school of combat the best tactics for overcoming North Vietnam's increasingly lethal air defenses. The success with which the Navy executed the Linebacker campaign against North Vietnam in 1972 revealed how much the service had learned from and exploited the Rolling Thunder experience of 1965–1968. ⚓

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A catapult crew of carrier *Ranger* (CVA-61) readies an A-4 Skyhawk attack plane for a March 1965 bombing mission over North Vietnam.

THE START OF AN AIR CAMPAIGN

Rolling Thunder, initially involving U.S. and South Vietnamese air forces, began on 2 March 1965, following two weeks of delay caused by political upheaval in Saigon and foul weather over North Vietnam. Indeed, throughout the war the Air Force units based in Thailand and the Navy squadrons on board aircraft carriers in the Gulf of Tonkin would find the weather over Indochina almost as difficult to deal with as the enemy. During the northeast monsoon, which lasted from November to March, huge billowy clouds, sudden rain squalls, and dense fog severely reduced visibility over North Vietnam and the Gulf of Tonkin, making life miserable and dangerous for aviators. The southwest monsoon from May to September brought similar weather to Laos and South Vietnam.

The first Navy attack of Rolling Thunder took place on 15 March 1965, when aircraft from Rear Admiral Henry L. Miller's Task Force 77 carriers *Ranger* (CVA-61) and *Hancock* (CVA-19) bombed the ammunition depot at Phu Qui between Vinh and Thanh Hoa. After crossing the coastline, 64 A-4 Skyhawk and A-1 Skyraider attack planes arrived over the target at 1300 and descended through a break in the heavy cloud cover. Even before they reached the targets, eight F-8 Crusader fighters attacked North Vietnamese antiaircraft defenses with rockets and cannon fire. Still, the attack planes had to fly through intense 37mm and small arms fire before they could drop their general purpose iron bombs and fire rockets and 20mm cannon at the depot complex. Bombs containing jellied gasoline (napalm), first used in World War II, made their debut in attacks on North Vietnam on this mission. When the returning strike group radioed "feet wet" as they crossed the coast, the planes had destroyed or severely damaged 21 buildings, which two RF-8A Crusader reconnaissance planes confirmed with post-strike photos.

North Vietnamese MiG fighters did not challenge the American planes, but eight F-4 Phantom IIs, ten Crusaders, and two Skyraiders flying combat air patrol were ready for them if they had appeared. Lieutenant (j.g.) Charles F. Clydesdale was forced to ditch his damaged and smoking Skyraider at sea. The destroyer *Wiltsie* (DD-716), one of two plane guards, immediately dispatched a helicopter to the splash site, but Clydesdale did not escape from his sinking plane.

The other 93 planes made it back to their carriers, although four of the piston-engine Skyraiders suffered damage from antiaircraft fire. The mission was the first of the Rolling Thunder multiplane, multicarrier operations called "Alpha strikes." These missions employed planes of various types: attack aircraft (A-1 Skyraiders, A-4 Skyhawks and later A-6 Intruders and A-7 Corsair IIs), fighters (F-8 Crusaders and F-4 Phantoms), special antiradar aircraft (A-4s and later A-6s), and various support aircraft (tankers, photoreconnaissance, and electronic warfare planes).

In addition to striking targets in North Vietnam, Navy and Air Force planes continued bombing operations in Laos, which had begun in 1964. These strikes were focused on the Plain of Jars in central Laos in support of CIA-armed Hmong tribesmen under Lieutenant General Vang Pao and especially on the Ho Chi Minh Trail in the panhandle of southern Laos. The goal of the latter operation was to severely strain if not cut the enemy's logistic pipeline into South Vietnam. The air forces concentrated on interdicting the trail at several chokepoints—the Ban Karai, Nape, and Mu Gia mountain passes between North Vietnam and Laos. Other attack aircraft flew armed route reconnaissance missions in pairs over both Laos and North Vietnam in search of targets of opportunity such as trucks, river craft, and antiaircraft sites. The American air forces compelled the enemy to restrict most vehicle, bicycle, and even foot traffic to darkness, but they could not sever the supply line. The North Vietnamese and their Laotian Communist allies developed a sophisticated logistic operation

that featured multiple vehicle parks, refueling stations, rest stops, antiaircraft defenses, and hundreds of miles of roadways, trails, and paths.

The aircraft carriers taking part in these strikes operated from Yankee Station, a staging area in the Gulf of Tonkin located roughly between the Demilitarized Zone and the Chinese island of Hainan, at grid coordinates 17˚30' N and 108˚30' E. By 1966, three or four carriers along with cruisers, destroyers, and frigates formed Task Force 77, the Seventh Fleet's Attack Carrier Striking Force. The Seventh Fleet commander, a vice admiral, reported to the four-star Pacific Fleet commander at Pearl Harbor. During Rolling Thunder, Admirals Roy L. Johnson and John J. Hyland served successively as Commander in Chief, Pacific Fleet (CINCPACFLT). These officers were in turn responsible to CINCPAC, Admirals Sharp and later John S. McCain Jr.

Lieutenant General Joseph H. Moore, Commander Seventh Air Force, had a similar chain of command up to CINCPAC. Moore and later Seventh Air Force commanders sought to have all air operations in the war zone placed under a centralized—Air Force—command. But the Navy kept its carrier operations entirely under the control of Navy flag officers up through CINCPAC.

In reality, the President and the Secretary of Defense ran the air war from Washington. In the effort to prevent any action that might cause North Vietnam's Communist allies to intervene directly in the conflict, Washington prohibited strike operations closer than 25 nautical miles to the border with China; 30 nautical miles of the North Vietnamese capital of Hanoi; and 10 nautical miles of Haiphong, the country's main port. These operational restrictions put North Vietnam's most vital industries—power-generating facilities, ports, transportation centers, and airfields—beyond the reach of U.S. airpower in the early months of Rolling Thunder.

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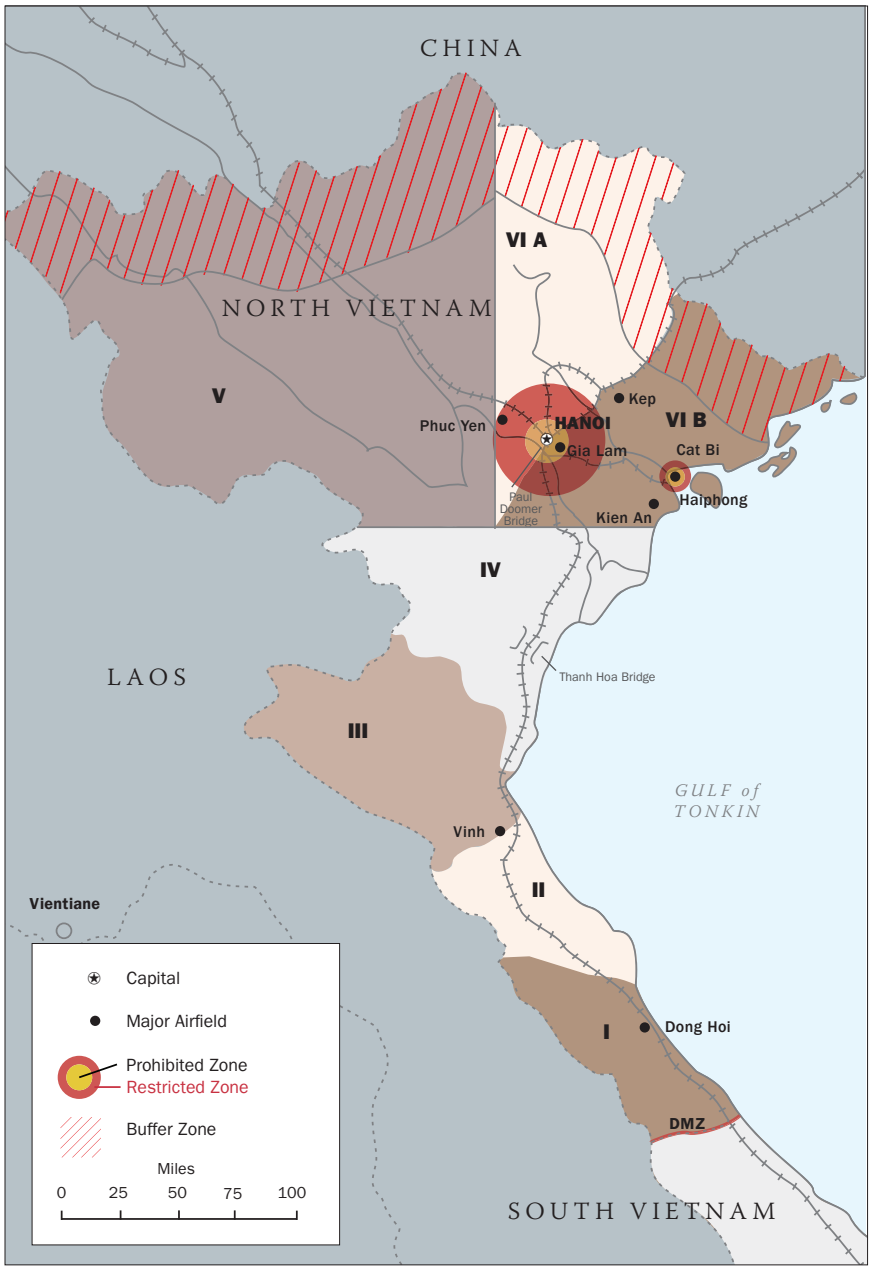
Carrier stations off Indochina.

Air Force and Navy leaders tried a number of approaches to dividing the bombing responsibility in North Vietnam, but different service operating methods compelled Admiral Sharp to establish separate areas, or "route packages," for each service. The Air Force flew the attacks in Route Packages V and VIA, the areas closest to their bases in Thailand. The U.S. Military Assistance Command,



Route Packages and Prohibited Zones in North Vietnam.

Vietnam (MACV) under General William C. Westmoreland was responsible for Route Package I, just north of the Demilitarized Zone. The Navy carriers focused their strike efforts on the coastal regions in Route Packages II, III, IV, and VIB.

Few service leaders liked the divided command and control structure employed for the Vietnam air war. The Air Force, Navy, and Marine Corps each had different operational requirements, resources, and warfighting cultures that precluded centralized control. Nonetheless, leaders and commanders in the operational theater routinely cooperated with one another to fashion a powerful offensive force, and combat units from the different services routinely worked together. For example, Navy warships used their advanced air search radars to warn Air Force planes of approaching enemy fighters; Air Force search and rescue (SAR) aircraft plucked downed naval aviators from the sea; and Marine ground forces prevented Viet Cong guerrillas from overrunning Air Force bases in South Vietnam.

Carrier-based A-4 Skyhawks, A-1 Skyraiders, F-8 Crusaders, and F-4 Phantoms flew most of the Navy strikes. On 29 March 1965, six aircraft from *Ranger*'s Heavy Attack Squadron (VAH) 2 became the first A-3B Skywarriors (35-ton aircraft designed for the nuclear strike role) to drop bombs in combat when they hit targets on Bach Long Vi (Nightingale Island) in the Gulf of Tonkin. Heavy haze prevented visual sighting of the targets, so the Skywarriors used radar to drop 12 tons of bombs on several sites. Throughout the summer of 1965, Skywarrior detachments demonstrated their versatility as bombers, aerial tankers, and electronic warfare and reconnaissance aircraft. Like their companions, the A-1 Skyraiders and A-4 Skyhawks, also designed by

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The forward 8-inch turrets of heavy cruiser *Saint Paul* (CA-73) open up against targets on the coast of North Vietnam.

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Commander Charles H. DeLorenzi, the commanding officer of Heavy Attack Squadron 2, pilots his A-3B Skywarrior during a bombing mission over Vietnam in October 1965.

the Douglas Aircraft Company's legendary engineer Ed Heinemann, Skywarriors proved to be highly versatile combat aircraft.

The aircraft on Yankee Station employed a vast array of ordnance, from World War II and Korean War-era iron bombs to precision-guided munitions (PGMs). Navy attack planes initially dropped 250-, 500-, 750-, 1,000-, and 2,000-pound general purpose bombs, napalm bombs, and Shrike AGM-45 antiradar missiles. The planes also used 5-inch Zuni and 2.75-inch rockets against ground targets. The Navy emphasized preparation for nuclear war in its pilot training programs of the 1950s and early 1960s; thus the Vietnam squadrons had to adapt their tactics to the conventional strike warfare role.

One of the Navy's primary weapons for destroying rail and highway bridges—key components of North Vietnam's transportation system—was the AGM-12 Bullpup air-to-ground missile. The bullet-shaped, 1,785-pound Bullpup-A had a 990-pound

warhead and was propelled by a rocket engine that could accelerate it to Mach 2 speeds with a range of more than ten miles. The launching aircraft, however, had to descend toward the target straight on, at relatively slow speed, and with wings level as the pilot used a joystick to visually guide the weapon into the target. This approach was an antiaircraft gunner's dream! Few naval aviators were fond of the Bullpup.

Surface warships were an active part of Task Force 77. Beginning in October 1966, 8-inch- and 6-inch-gun cruisers and 5-inch-gun destroyers and frigates (DLGs) moved along the coast of southern North Vietnam in Operation Sea Dragon to sink waterborne logistic craft (referred to as WBLCs, or "Wiblics"), bombard coastal roads and rail lines, and destroy enemy coastal guns and radar sites.

The carrier-based S-2 Tracker antisubmarine warfare aircraft and A-1 Skyraiders helped the surface ships by spotting enemy targets. At one time or another, the Royal Australian Navy destroyers *Hobart*, *Perth*, *Brisbane*, and *Vendetta* served with the Sea Dragon force, as did the battleship *New Jersey* (BB-62). By early 1967, pairs of surface warships—including at least one guided missile ship—operated as far north as the 20th parallel. The North Vietnamese tried repeatedly but failed to sink these ships with air attacks. And, when the ships were close to the shore for bombardment they came under fire from North Vietnamese coastal guns. Those guns damaged 19 U.S. ships and killed and wounded scores of American sailors.

Enemy aircraft also took a toll on naval aircraft and aircrews. On 3 April 1965, strikes by Carrier Air Wing (CVW) 21 led by Commander Warren Sell from *Hancock* and CVW-15 led by Commander H. P. Glickman from *Coral Sea* (CVA-43) destroyed the Dong Phoung Thong highway bridge 65 miles south of Hanoi. Antiaircraft fire struck an A-4C

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General purpose, or iron, bombs crowd the deck before ordnancemen load them onto Task Force 77 attack planes.

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An AGM-12 Bullpup air-to-ground missile affixed to the wing of an A-7 Corsair.

THE DOUGLAS A-1 SKYRAIDER (originally AD, redesignated in 1962), designed during World War II and a mainstay of strike operations in the Korean War, served the Navy, the Air Force, and the Vietnam Air Force during the conflict in Southeast Asia. The propeller-driven Skyraider, called a "Spad," was known for its ability to carry a heavy load of ordnance and stay aloft for many hours. A-1s took part in strike operations during the early years of Rolling Thunder. Naval leaders eventually considered the planes too vulnerable to the enemy's sophisticated air defenses in the heart of North Vietnam and subsequently employed them for close air support missions in South Vietnam and as armed escorts for search and rescue missions in the less heavily defended regions of Indochina.

The workhorse of Task Force 77's attack arm during Rolling Thunder was the Douglas A-4 Skyhawk. The A-4s, fondly called "Scooters" by pilots who considered them easy to handle and a joy to fly, formed the core of the Alpha strikes against targets in North Vietnam. The A-4s carried bombs and rockets on attack missions and Shrike antiradar missiles to suppress enemy air defenses. Skyhawks flew more attack sorties than any other Navy plane and performed well in that role, but they also suffered heavy losses. Enemy air defenses shot down 195 A-4s, and operational accidents claimed another 77, representing almost one-third of all Navy aircraft lost in the war. A-4 pilots who fell victim to enemy fire early in the war included Lieutenant (j.g.) Everett Alvarez Jr., Commander James B. Stockdale, and Lieutenant Commander John S. McCain III. These men figured prominently in the prisoner-of-war (POW) experience. By the end of Rolling Thunder, the fleet had begun limiting the use of Skyhawks over the high-risk areas of North Vietnam.

As the air war over Vietnam escalated, new aircraft and weapons entered the fight. On 4 July 1965, carrier *Independence* (CVA-62) launched the first A-6A Intruders on a combat mission. The Grumman Intruder (originally A2F) was the first aircraft designed specifically to strike targets obscured by bad weather or darkness. It was a two-seat, twin-turbojet aircraft capable of carrying up to 15,000 pounds of conventional or nuclear weapons on five pylons; this capability outpaced that of even the celebrated prop-driven Skyraider series.

A key feature of the early Intruders was the digital integrated attack system (DIANE) that combined search and track radars; navigation, communications, and identification equipment; a cockpit display system; and a high-speed digital computer. DIANE enabled the pilot to preselect a target, guide the aircraft, release the weapons, and leave the target area automatically. From the time an Intruder catapulted from a carrier's flight

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The pilot of a propeller-driven A-1H Skyraider taxies his attack plane, loaded with bombs for a mission along the Ho Chi Minh Trail, into position for a catapult launch from *Ticonderoga* (CVA-14).

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A catapult officer (with yellow headgear and vest) and other flight deck crewmembers ready an A-7 Corsair for launch from *Ranger* (CVA-61) in December 1967.

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An A-4C Skyhawk of VA-172 is prepared for a mission in *On Board USS Shangri-La* by Verceill Tossey. Oil on canvas.

deck to its return from a mission over Vietnam the pilot had no need for visual references.

The debut of the first Intruder squadron—Attack Squadron (VA) 75—was marred by several losses. On the night of 17 September 1965, the squadron's commanding officer, Michael C. Vogt, and his bombardier-navigator were killed when their aircraft, apparently hit by antiaircraft fire, came down at sea.

The Ling-Temco-Vought (LTV, formerly Chance Vought) A-7 Corsair II, which bore a resemblance to the F-8 Crusader, first saw combat in December 1967, when *Ranger* entered the Gulf of Tonkin for her third Western Pacific deployment of the war. The Navy intended the Corsair to replace the A-4 Skyhawk as a light attack aircraft for daytime operations. Its designers anticipated the plane conducting deep interdiction strikes, with nuclear or conventional weapons, and providing close air support to ground forces.

When *Ranger* arrived in the South China Sea with VA-147, the first operational Corsair attack squadron, included in its ranks were 24 Air Force personnel—three of them carrier-qualified pilots—to evaluate the aircraft for their service, which later procured the A-7D variant. The Corsair could carry up to 15,000 pounds

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Two A-6A Intruders from *Constellation* (CVA-64)'s Attack Squadron 196 en route to North Vietnam. With their advanced navigation and targeting systems, the day-night, all-weather attack planes significantly improved bombing accuracy.

of weapons and drop tanks (or refueling equipment) on six wing pylons; two cheek pylons held Sidewinder air-to-air missiles. Initially the attack plane boasted a pair of 20mm M12 cannon, and the later A-7C and A-7E versions had a single 20mm multi-barrel Gatling gun. ⚓

Skyhawk from *Hancock*, forcing the pilot, Lieutenant Commander Raymond Vohden, to eject. He soon occupied a POW cell in North Vietnam's infamous Hoa Lo Prison, nicknamed the Hanoi Hilton. During this mission, for the first time in the war, North Vietnamese MiG-17 Fresco turbojet fighters attacked an F-8 Crusader flying combat air patrol for the strike group. Damage to the plane forced the Crusader pilot to divert to Danang Airfield in South Vietnam, where he landed safely. Believing that the Crusader had been destroyed, and to celebrate the event, the North Vietnamese government established 3 April as Air Force Day.

The first loss of American aircraft to MiG fighters occurred the following day, 4 April, when four MiG-17s engaged Air Force F-105D Thunderchiefs attacking the soon-to-be-infamous "Dragon's Jaw" bridge at Thanh Hoa.* After intercepting and shooting down two F-105s, whose pilots did not survive, the MiGs dove away before U.S. fighters could react. But three of the four MiG-17s did not return to base. North Vietnamese antiaircraft gunners, apparently mistaking the MiGs for American planes in the heat of battle, shot down the trio as well as another F-105D.

The success of the MiG-17s surprised Navy and Air Force commanders, who had considered the Soviet-built, Korean War–era planes and their green pilots no match for the mainline F-4 Phantoms and F-8 Crusaders with highly trained naval aviators. The first North Vietnamese fighter unit—the 921st Red Star Fighter Regiment—had only been established in February 1964.

Soon after the start of the air combat over North Vietnam, U.S. commanders realized that their top fighter, the Phantom, had sacrificed maneuverability for high-performance and multimission capability. While long-range missiles designed for stand-off action against Soviet missile-carrying bombers were intended to reduce the likelihood of a dogfight, the tight rules of engagement set by U.S. political leaders for the skies over Vietnam required visual identification before a missile could be fired. When missile-armed aircraft failed to achieve the expected high kill ratios, U.S. pilots and military leaders recognized that close-in dogfighting was not a relic of the past. The long-range missile's design philosophy that had created the Navy's gunless F-4 degraded the plane's close-in fighting ability. Aviation historian Lon Nordeen aptly observed that "anyone who thought the ten-year-old MiG-17 was an obsolete aircraft with no capability against modern U.S. fighting machines was sadly mistaken."

* Throughout Rolling Thunder, Navy and Air Force squadrons attacked the strategic bridge but failed to bring it down, suffering the loss of many planes and crews. In April 1972, Air Force planes dropped portions of the bridge, but did not permanently disable it. That October, Attack Squadron 82 flying A-7 Corsairs from *America* (CVA-66) employed a combination of precision-guided munitions and general purpose bombs to finally knock out the bridge.

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Carriers *Ranger* (CVA-61) (foreground) and *Coral Sea* (CVA-43) launched heavy strikes against targets below the 20th parallel of North Vietnam during the spring of 1965.

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HMAS *Hobart* and three other Royal Australian Navy destroyers fought alongside their American counterparts in Operation Sea Dragon.

Soon after the MiG-17's entry into the Vietnam conflict, the North Vietnamese government responded to an American call for diplomatic talks. On 8 April 1965, Premier Pham Van Dong stated that negotiations could begin when the United States halted the bombing of North Vietnam and removed all of its troops from the South; the South Vietnamese government recognized the demands of the National Liberation Front (political arm of the Viet Cong); and all parties agreed that only the Vietnamese would decide on how to unify the country. From Washington's standpoint these were unacceptable demands. It also revealed to American leaders that as yet Rolling Thunder had failed to induce North Vietnamese leaders to negotiate an end to the conflict.

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A Soviet-made MiG-17 Fresco in flight.

On 9 April 1965, Navy aircraft once again engaged MiGs. That day *Ranger* launched two F-4 Phantoms of Fighter Squadron (VF) 96 for a combat air patrol over the northern Gulf of Tonkin. The first aircraft suffered an engine failure as it was being catapulted—an ominous beginning to the mission. The two crewmen, however, ejected safely, and a SAR helicopter quickly retrieved them from the sea. A

TWO OUTSTANDING FIGHTERS FLEW from U.S. carrier decks during Operation Rolling Thunder—the McDonnell Douglas F-4 Phantom II (formerly F4H) and the Ling-Temco-Vought F-8 Crusader (formerly F8U). Both aircraft were designed specifically for shipboard operation. The Phantom also flew from British carriers and was flown by the Royal Air Force ashore. The French Navy launched Crusaders from their carriers. The U.S. Air Force and several foreign air arms employed Phantoms from land bases. The Phantom and the Crusader proved to be lethal adversaries of the Soviet-built MiG fighters during the Vietnam conflict.

More Phantoms were produced than any other U.S. post–World War II military aircraft except for the F-86 Sabre/FJ Fury, and the P-80/T-33 Shooting Star. During the 1960s and 1970s, Phantoms were the mainstay fighter aircraft of the U.S. Navy, Marine Corps, and Air Force and were operated by the air forces of ten foreign nations, some well into the 21st century.

The McDonnell Aircraft Company initially designed the Phantom as a single-seat, fighter-attack aircraft, at one point designated AH-1. During the plane's development the Navy changed its requirements to a long-range, high-altitude interceptor designated F4H (F-4 after 1962). The Phantom was the Navy's first fighter not armed with guns, but had an all-missile armament. A radar operator sat behind the pilot to operate the complex electronics systems. The first Phantom flew in 1958, and it soon became known as a winner.

The F8U-3 Crusader III competed with the Phantom as the Navy's advanced fighter. It was a single-engine, single-pilot, specialized interceptor compared with the two-engine, two-man F4H-1 multimission aircraft. Both planes could reach level speeds in excess of Mach 2. In 1958 the Navy selected the Phantom, with its speed of Mach 2.2, over the advanced Crusader as its standard carrier-based fighter. And in 1962 Secretary of Defense Robert McNamara directed the Air Force to procure Phantoms instead of additional F-105 Thunderchiefs, a specialized attack aircraft.

The Phantom relied on armament of six Sparrow radar-homing missiles or four Sparrows and four Sidewinder heat-seeking missiles for intercepts. In the attack role a Phantom could carry a payload of almost eight tons—nearly double the maximum load of a World War II B-17 Flying Fortress. The weapons load could include eleven 1,000-pound bombs or eighteen 750-pounders or four Bullpup air-to-surface missiles. The Phantom could carry four Sparrows with any of these attack loads.

Entering U.S. Navy service in 1962, Phantoms first saw combat in August 1964, when F-4s from *Constellation* (CVA-64) escorted attack aircraft that bombed targets in North Vietnam following the Gulf of Tonkin incident. The first air-to-air encounter came on 17 June 1965, when two Phantoms from *Midway* (CVA-41) tangled with four North Vietnamese MiG-17 fighters. The Phantoms

NHHC VN Collection

A *Kitty Hawk* (CVA-63) F-4B Phantom of Fighter Squadron 114 high above the clouds of North Vietnam during Rolling Thunder. While the Phantom lacked guns, its Sparrow radar-guided and Sidewinder heat-seeking missiles claimed many enemy fighters.

NHHC VN Collection

An F-8 Crusader fires an AIM-9 Sidewinder air-to-air missile.

used Sparrow missiles to down two of the MiGs and suffered no losses. After that, Navy and Air Force Phantoms regularly engaged and defeated MiG-17s. All five U.S. fighter aces of the Vietnam War (two Navy and three Air Force) scored their aerial victories with the aircraft. F-4s were responsible for 36 of the Navy's Vietnam aircraft kills. Overall, the Phantom demonstrated a marked superiority over the MiG-21 and lesser aircraft encountered in Vietnam. Air Force and Marine squadrons also flew the RF-4, a photo reconnaissance variant of the versatile jet. The F-4 Phantom merited the numerous accolades heaped upon the plane during its 35-year career with the U.S. armed forces.

The F-8 Crusader, first flown in 1955 and designated F8U prior to 1962, served as the Navy's single-seat, high-performance, day fighter. Faced with the problem of developing a Mach 1.8 fighter with good carrier-landing characteristics, Vought designers created a plane whose wing raised up seven degrees during launches and recoveries, thus providing the angle-of-attack necessary for a 130-mph landing speed and still have the fuselage in a near-horizontal attitude for maximum pilot visibility.

The Crusader had four 20mm cannon, a Sidewinder missile rail on each side of the fuselage, and a rocket pack that opened from the bottom of the fuselage to fire thirty-two 2.75-inch, unguided, air-to-ground rockets. The Navy deleted the rocket pack from later models and modified the missile rails so that each could launch two Sidewinder air-to-air missiles.

The first F8Us entered Navy and Marine fighter squadrons in 1957. In June of that year, a pair of Crusaders launched from *Bon Homme Richard* (CVA-31) off the California coast and with in-flight refueling, recovered on board *Saratoga* (CVA-60) off the Florida coast; the flight spanned the continent in three and a half hours. A month later, Marine Major John H. Glenn Jr. piloted an F8U-1P photo variant from California to New York in 3 hours, 28 minutes, 50 seconds for an average speed of 723.5 mph, a cross-continent record.

By 1960, more than half of the Navy's 30 carrier-based fighter squadrons and most of the Marine Corps fighter squadrons flew the Crusader, as did the French Navy. At that time unarmed F8U-1P Photo Crusaders served in two- and three-plane detachments on all Navy attack carriers and in the three Marine reconnaissance squadrons.

Like the Phantom, the Crusader first saw combat during the Gulf of Tonkin incident of August 1964, when they flew from *Ticonderoga* (CVA-14) as part of the Pierce Arrow retaliatory strike operation. Crusaders flew throughout the Vietnam conflict and shot down 18 MiGs. The F-8 claimed one of its victims with 20mm cannon fire and all the others with Sidewinders or a combination of guns and missiles. ⚓

NHHC VN Collection

Their pre-mission briefing completed, naval aviators at Yankee Station head for their A-4 Skyhawks in April 1965. The pilots and their planes will soon carry out an Alpha strike in North Vietnam.

standby Phantom took the place of the lost plane, and the two aircraft streaked northward. Four Chinese navy MiG-17s engaged these Phantoms as well as another pair already in the area. The aerial battle took place at high altitude near China's Hainan Island.

The Phantom of Lieutenant (j.g.) Terence Murphy and his radar intercept officer (RIO), Ensign Ronald Fegan, destroyed a MiG-17, as later reported by Chinese media. Murphy then radioed that his plane was out of missiles; the pair was never heard from again. The Navy did not give them official credit for the MiG kill because of the sensitivity over American and Chinese forces engaging in combat. This would not be the last instance of such contact, however. During the Vietnam War, Chinese MiGs downed five Navy aircraft (two A-6A Intruders, one F-4B Phantom, one A-1H Skyraider, and one KA-3B Skywarrior) and two Air Force planes (one F-4C and one F-104C). Navy Lieutenant Robert Flynn of Attack Squadron 196 was the only survivor of the two Intruders downed over China, whose government released him from captivity in 1973.

NHHC VN Collection

This dramatic aerial reconnaissance photo shows enemy soldiers who have just disembarked from a troop train near Thanh Hoa, North Vietnam, heading south for combat operations in the Republic of Vietnam.

By the spring of 1965, carrier aircraft were executing more than 100 strike sorties every day. In one instance, 110 aircraft from *Hancock* and *Coral Sea* struck radar sites and antiaircraft positions in North Vietnam. The increasing sorties brought with them increasing losses of men and planes. On the first day of June, the enemy shot down a pair of RF-8 reconnaissance planes and the next day destroyed two A-4 Skyhawks and an EA-1F Skyraider sent to the crash site on a SAR mission. The two-day loss of five aircraft and eight aircrew (six killed, two made prisoner, one rescued) was the heaviest of the war—so far.

NHHC VN Collection

The bridge at Xom Ca Trang 60 miles north of the Demilitarized Zone shows the effects of a carrier strike. Attack planes from *Coral Sea* took out one of the structure's center spans with Bullpup missiles on 16 April 1965.

The men flying from the Yankee Station carriers recognized that their tactic of approaching targets at low level—a holdover from training for nuclear war—put them in great danger from antiaircraft artillery, and even small arms. The enemy's small arms and antiaircraft artillery accounted for three times the number of Navy and Marine aircraft lost to MiGs and surface-to-air missiles (SAMs) during the war. Despite the danger from MiGs and SAMs at the higher altitudes, the attack squadrons operated there as much as possible to lessen the antiaircraft artillery threat. ⚓

Navy Art Collection

Plane Handlers by John Steel. Acrylic drawing.

NHHC VN Collection

Midway (CVA-41), with a complement of A-4 Skyhawks, A-1H Skyraiders, and A-3B Skywarriors on deck, steams in the South China Sea in early 1965.

While the air action over North Vietnam accelerated, Navy and Marine aircraft joined Army, Air Force, and Vietnam Air Force planes on 15 April 1965 to strike Viet Cong positions in the South for the first time. Navy attack aircraft from *Midway* (CVA-41) and *Coral Sea* (CVA-43) participated, as did Marine F-8E Crusaders from Marine Fighter Squadron (VMF) 212 flying from *Yorktown* (CVS-10). The combined forces bombed Viet Cong positions on Nui Ba Den (Black Virgin), a mountain that dominated the otherwise flat terrain northwest of Saigon. All carrier aircraft returned safely to their ships.

The Navy's participation in the operation was so successful that General Westmoreland, the MACV commander, requested that the Navy establish a permanent carrier station off South Vietnam to support his ground forces. The lack of sufficient land bases in South Vietnam for Air Force aircraft prompted his request. As in the Korean War, during the initial stages of the conflict the Navy's carriers provided allied forces with a movable airfield that could steam off the coast of Vietnam with little fear of enemy attack.

The vulnerability of land bases in South Vietnam to mortar, rocket, and ground attack was another factor that prompted Westmoreland's request. For example, on 27 October 1965, Viet Cong sappers destroyed or damaged more than 40 U.S. aircraft on the Marine airfields at Danang and Chu Lai. The killing of 32 Viet Cong saboteurs during these attacks did not compensate for the loss of much-needed and costly aircraft. During the course of the war, the enemy destroyed or heavily damaged almost 3,000 fixed-wing aircraft and helicopters on airfields in South Vietnam.

NHHC VN Collection

General William C. Westmoreland, Commander U.S. Military Assistance Command, Vietnam, returns the salute of Rear Admiral Henry L. Miller, Commander Task Force 77 and side boys of carrier *Ranger* (CVA-61) in March 1965. The general's advocacy led the Navy to establish the carrier staging area southeast of Cam Ranh Bay known as Dixie Station.

Pacific Fleet commander Admiral Roy L. Johnson, following a request by General Westmoreland, directed the establishment of Dixie Station, a carrier staging area about 100 miles southeast of Cam Ranh Bay at 11° N and 110° E. The setup of Dixie Station meant that of the four carriers then being

deployed to the combat theater, one would operate from Dixie Station and two from Yankee Station, with the fourth carrier at the Subic Bay Naval Base in the Philippines for the rest and recuperation of her sailors and Marines and for maintenance. Mid-year 1965 the Navy authorized the deployment of another carrier to the operational area, bringing a total of five to Southeast Asian waters.

The carrier squadrons on Dixie Station destroyed numerous enemy ammunition dumps, fortified positions, and storage huts in the jungle of Vietnam. At critical times, carrier units frustrated enemy ground attacks and chased surviving attackers back into their forest lairs. By the end of the year, the Dixie Station aircraft had flown 26,000 attack, reconnaissance, search and rescue, and combat air patrol sorties, totaling one-third of all allied air sorties over South Vietnam.

One memorable operation occurred in early June 1965, when two Viet Cong regiments fired a 200-round mortar barrage and stormed into the Army Special Forces camp at Dong Xoai, northeast of Saigon. Through the night of 9 June and the next day, Army Green Berets, South Vietnamese paramilitary troops, and nine Seabees of Naval Mobile Construction Battalion Team 1104 fought for survival. Construction Mechanic 3rd Class Marvin Shields, even though he was mortally wounded, pulled fellow defenders to safety and silenced an enemy machine gun position. Shields became the only Seabee awarded the Medal of Honor.

Carrier-based and other allied air support prevented the enemy from killing or capturing the survivors and permanently occupying the camp. From 10 to 14 June, *Oriskany* (CVA-34)'s Carrier Air Wing 16, along with other U.S. and South Vietnamese air units, strafed enemy troops, flattened overrun buildings, and helped friendly ground forces break the siege.

NHHC VN Collection

In the early morning of 26 August 1966, Marines move across the flight deck of amphibious assault ship *Princeton* (LPH-5) to board helicopters that will transport them to South Vietnam's Rung Sat Swamp south of Saigon. The troops, supported by Seventh Fleet carriers at Dixie Station, took part in amphibious Operation Jackstay.

The air war in the South continued apace during 1966. Mostly land-based Army, Air Force, and Marine Corps fixed-wing aircraft and helicopters flying from Thailand and South Vietnam carried out close air support and interdiction missions. The air wing aviators from the Dixie Station carrier familiarized themselves with combat operations in the less lethal skies of South Vietnam before their deployment to Yankee Station off North Vietnam.

Dixie Station carriers also provided air support for amphibious and coastal operations. Carriers *Hancock* (CVA-19) and *Kitty Hawk* (CVA-63) and amphibious assault ship *Princeton* (LPH-5) took part in the war's first and largest combined arms, multiservice amphibious action. Operation Jackstay, which began on 26 March 1966 in South Vietnam's Rung Sat Special Zone 35 miles southeast of Saigon,

also involved Air Force B-52 bombers flying from Guam, as well as U.S. Army helicopter and fixed-wing aircraft, Navy and Coast Guard patrol boats, and one U.S. and two South Vietnamese Marine battalions. Despite this enormous outlay of resources and 38 casualties, at the end of the 12-day operation the allies had killed or captured just 69 Viet Cong guerrillas and only temporarily disrupted enemy operations in the area.

With Air Force and Marine airfields in South Vietnam largely completed and operating combat aircraft by August 1966, the Navy disestablished Dixie Station. For the rest of the war, the Navy deployed all incoming carriers to Yankee Station, where they operated for the most part against targets in North Vietnam but continued launching strikes into South Vietnam and Laos when required.

Enabling the carriers at both Dixie and Yankee stations and their escort ships to remain in the fight 24 hours a day, seven days a week was the Navy's at-sea replenishment system that had been proven in combat during World War II and the Korean War, and strengthened in the Vietnam War. The Seventh Fleet's Mobile Logistics Support Force (Task Force 73) operated ammunition, stores, repair, and salvage ships; tugs; and oilers. In a typical underway replenishment (UNREP), logistic ships moved alongside combatants to provide them, via high-lines and hoses strung between the ships, "beans, bullets, and black oil." The war saw a significant innovation to the UNREP method with the use of helicopter transfers—vertical replenishments—of parts and munitions. During the war, the Navy introduced fast combat support ship *Sacramento* (AOE-1) and combat stores ship *Mars* (AFS-1) to the logistic fleet. Both types combined the functions of many auxiliaries, carrying vast quantities of ammunition, fuel, and other supplies. ⚓

NHHC VN Collection

While underway in the South China Sea, fast combat support ship *Camden* (AOE-2) refuels carrier *America* (CVA-66) to port and destroyer *Harry E. Hubbard* (DD-748) to starboard as destroyer *Walker* (DD-517) waits her turn astern. A CH-46 helicopter, key to the vertical replenishment of warships with supplies, prepares to land on the carrier.

NHHC VN Collection

A Seasprite of Helicopter Combat Support Squadron 1 lifts off *Bon Homme Richard* (CVA-31) for a SAR mission in the Gulf of Tonkin.

RESCUING DOWNED AVIATORS

The Navy and the Air Force invested enormous resources in the effort to recover aircrews downed at sea or in North Vietnam, Laos, and South Vietnam. As soon as an allied plane went down, the rescue combat air patrol moved into action. A-1 Skyraiders and other fixed-wing aircraft immediately tried to make contact with the downed airmen and, if need be, attack enemy forces near the crash or splash area. Simultaneously, airborne early warning aircraft coordinated the dispatch of Navy SH-3 Sea King and UH-2 Seasprite helicopters based on carriers or surface combatants, and Air Force HU-16 Albatross amphibians and HH-3E "Jolly Green Giant" helicopters based in Thailand and South Vietnam.

The first rescue of a Navy pilot shot down in North Vietnam occurred on 20 September 1965. An A-4E Skyhawk from *Independence* (CVA-62), an Atlantic Fleet carrier operating off Vietnam, went down 20 miles east of Hanoi. A SAR helicopter rescued the pilot, Lieutenant (j.g.) John R. Harris of VA-72, and delivered him safely to missile cruiser *Galveston* (CLG-3) in the Gulf of Tonkin.

While a number of downed fliers were rescued, many more were not, especially those who went down inland. Often injured during their violent ejection from badly damaged and burning planes, aircrews landed amid crowds of angry villagers who frequently beat them before the local militia or troops intervened and dispatched them to the prison camps around Hanoi. On many occasions, North Vietnamese forces set traps for the helicopters and other aircraft attempting to rescue pilots. One ruse was to use captured survival radios and to spread parachutes to lure the SAR planes in close for attack by hidden antiaircraft guns. Navy and Air Force SAR units retrieved only a small number of men who went down in North Vietnam or Laos, but the SAR crews willingly took great risks to rescue downed aviators, who were clearly grateful for that dedication.

Courtesy National Naval Aviation Museum

Squadronmates share a moment of joy with Lieutenant Commander John Holtzclaw after his rescue from the shoot-down site in North Vietnam by Lieutenant (j.g.) Clyde Lassen and the crew of his SAR helicopter.

One of the most remarkable episodes of the war began on 1 February 1966, when German-born Lieutenant (j.g.) Dieter Dengler launched from *Ranger* (CVA-61) in an A-1J Skyraider as part of an interdiction mission near Mu Gia Pass between Laos and North Vietnam. Ground fire severely damaged Dengler's plane, forcing him to crash-land in Laos. The naval aviator evaded discovery through the night, but the following day Laotian Communist Pathet Lao guerrillas captured him. The guards brutalized Dengler as they force-marched him through the jungle.

Once they arrived at a rudimentary camp, the Pathet Lao guards shoved Dengler into a rough hut with six Thai, Chinese, and American prisoners,

Navy Art Collection

Crewman in Rescue Chopper after Mission by John Steel. Acrylic drawing.

some of whom had been held for more than two years. From March through late June, the prisoners suffered from the elements, inadequate food and medical care, and mistreatment by their captors. Seizing an opportunity, on 29 June Dengler and his fellow prisoners captured their guards' weapons and either killed or drove them off and made their escape. The former prisoners split up and headed into the jungle; Dengler and one other captive were the only men ever seen again. Wandering in the dense jungle, fellow American Duane Martin and Dengler, severely ill with jaundice, lived on some rice and berries gathered in the bush. The escapees floated down a river on a makeshift raft.

When villagers attacked and killed Martin, Dengler pressed on with declining strength. Weakened by hunger and disease, frightened, and on the edge of despair 23 days after his escape, the naval officer lay down on a large rock in a jungle clearing. He was almost out of hope. An Air Force A-1E Skyraider appeared above and then made a return pass. Dengler ripped up a parachute remnant and waved it frantically over his head. The "Spad" radioed for help and soon after an Air Force HH-3E helicopter arrived and rescued him. The story of his escape, jungle ordeal, and dramatic rescue electrified America. Dengler eventually returned to duty, and he provided the Navy's training establishment with a wealth of information and insight on the POW and escapee experience.

An important responsibility for U.S. warships operating along the coast was to rescue downed aircrews. At times these combatants traded fire with North Vietnamese shore batteries. In July 1966, frigate *King* (DLG-10) saved five aviators, one of whom was plucked from deep inside North Vietnam by the ship's helicopter. During two months in 1967,

destroyer *Wiltsie* (DD-716) rescued nine airmen. These ships also refueled the large, carrier-based rescue helicopters, which touched down temporarily on their small flight decks or hovered above the ship to connect to a refueling hose.

In July 1967, Lieutenant Neil R. Sparks navigated his SH-3 Sea King helicopter through heavy North Vietnamese air defenses and hovered for 20 minutes over the site of a downed naval aviator 30 miles south of Hanoi. During that time, enemy ground fire damaged his radios and other equipment and threatened to bring down the helicopter. Sparks retrieved the aviator, Lieutenant Commander Demetrio A. Verich, piloted the Sea King back over hostile territory, and delivered the grateful pilot to his carrier home. For displaying extraordinary courage and professional skill during this successful two-and-a-half-hour mission, Sparks was awarded the Navy Cross.

The workload of the Navy and Air Force SAR forces—and the cost in lives and destroyed aircraft—increased dramatically as the North Vietnamese deployed more antiaircraft guns, surface-to-air missile batteries, and advanced MiG fighters. An especially black day for the Navy's SAR forces was 19 July 1967. Soon after an *Oriskany* (CVA-34) A-4 Skyhawk, piloted by Lieutenant Commander Richard D. Hartman, went down near Hanoi, enemy gunfire killed one crewmember of a *Hornet* (CVS-12) SH-3A and put bullet holes in the helicopter, which escaped. Antiaircraft fire then damaged the rotors of a SAR helicopter dispatched from guided missile frigate *Worden* (DLG-18), which also survived. The enemy next shot down another Sea King to arrive on the scene, killing its four-man crew. North Vietnamese gunners then downed a Skyhawk of the escorting force, compelling the pilot to parachute into the gulf for an at-sea rescue. Completing the tragedy of this event, the North Vietnamese eventually found Hartman, the naval aviator the SAR force had tried so hard and at so high a cost to rescue; he died in captivity. Hanoi returned his remains in 1974.

Other SAR missions had better endings. On one memorable occasion, an officer and his crew demonstrated exemplary courage and professionalism

NHHC VN Collection

A Seasprite dispatched from carrier *Constellation* (CVA-64) lifts Aviation Jet Mechanic 3rd Class Joseph J. Keola from the sea. SAR helicopters rescued not only pilots shot down but also sailors knocked overboard by jet blasts and other causes.

that helped save two naval aviators shot down in southern North Vietnam. Launching from the deck of guided missile frigate *Preble* (DLG-15) on the night of 19 June 1968, Lieutenant (j.g.) Clyde E. Lassen's UH-2 Seasprite helicopter sped to the scene of the shoot-down and located the American airmen on the ground. Dense foliage that damaged his low-flying helicopter and flares that fizzled out foiled Lassen's attempts to land close to the men. Despite being under enemy fire and low on fuel, Lassen decided to go for broke. He turned on his landing lights to guide the downed aviators to a clearing, landed, and hustled them on board. Dodging antiaircraft fire, and with only five minutes of fuel left in his tank, Lassen flew the helicopter out to a welcoming reception on board a Seventh Fleet ship. The Navy recognized the crew's successful accomplishment of the mission and the nation awarded Lassen the Medal of Honor.

Air-to-air combat between North Vietnamese MiGs and U.S. fighters often provided high drama. On 17 June 1965, Commander Louis C. Page and his back-seat radar intercept officer Lieutenant

NHHC VN Collection

Lieutenant (j.g.) Edgar L. Murphy armed and equipped to survive at sea or ashore walks away from his SAR helicopter on the flight deck of carrier *Bon Homme Richard* after a day's work.

Courtesy National Naval Aviation Museum

The wing of an F-4J Phantom from Fighter Squadron 84 shows the effects of North Vietnamese antiaircraft fire. The enemy's air defense artillery claimed hundreds more U.S. planes than did MiG fighters and surface-to-air missiles.

Commander John C. Smith picked up on radar four potentially hostile aircraft 60 miles south of Hanoi and 30 miles ahead of their F-4 Phantom II. Page alerted his wingman Lieutenant Jack E.D. Batson. Soon, four MiG-17 Fresco fighters came into sight and headed straight for the two Phantoms. Two of the North Vietnamese pilots made the fatal mistake of banking away from the Americans. Page maneuvered behind one enemy, squeezed off a missile, and climbed into the clouds overhead. Batson and his RIO, Lieutenant Commander Robert B. Doremus, fired one missile and followed Page's jet upward. The Sidewinders destroyed both MiG-17s. The other two enemy planes immediately reversed course and headed for the sanctuary of the Hanoi airspace. On hand to greet the four Phantom crewmen when they recovered on board *Midway* (CVA-41) was Secretary of the Navy Paul H. Nitze. He took time from his visit to the Seventh Fleet to broadcast to the carrier's crew the news that the Page/Smith and Batson/Doremus team had achieved the first American aerial victories of the war.

On two occasions during the conflict, propeller-driven Navy aircraft were able to destroy turbojet MiG-17s. On 20 June 1965, four A-1s from *Midway*'s VA-25 (the fleet's last operational Skyraider squadron) were engaged in a mission to rescue downed pilots when two MiG-17s pounced on them. Flight leader Lieutenant Commander Edwin A. Greathouse directed his pilots to fly close to the ground to prevent the faster enemy jets attacking from below. He also put his planes into a tight, circular formation that prevented the enemy aircraft from getting behind them. When a MiG tried to break into the

Navy Art Collection

F-4 Airstrike by John Steel. Gouache drawing.

circle, the Americans shot it out of the sky with 20mm cannon fire. All the naval aircraft on the mission returned safely to the carrier.

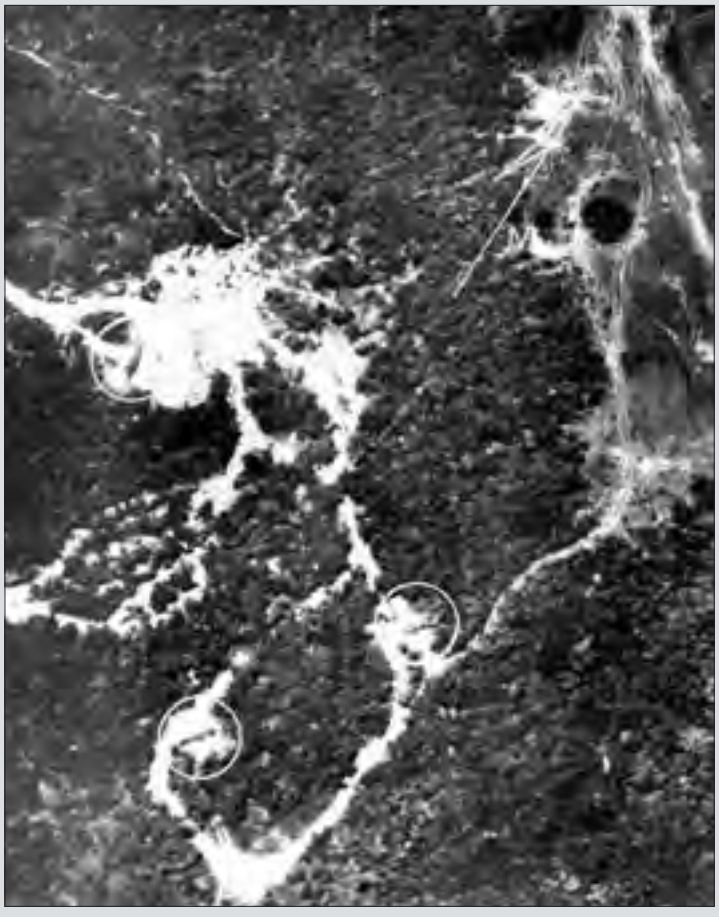
While the enemy's MiG and SAM victories captured headlines worldwide throughout Rolling Thunder, antiaircraft guns brought down the majority of the U.S. aircraft lost in Southeast Asia. As one example, Vietnamese antiaircraft gunfire shot down and captured one of the most senior U.S. naval officers taken during the war—Commander James B. Stockdale. On 8 September 1965, Stockdale led six planes from Carrier Air Wing 16 operating from *Oriskany* on a strike that destroyed an 18-truck convoy northeast of Thanh Hoa. On the negative side, enemy 37mm fire shot down an RF-8A reconnaissance plane, killing the pilot.

The following day, a North Vietnamese 57mm round badly damaged Stockdale's A-4E Skyhawk as he led a strike against a rail line. He bailed out of the stricken plane and parachuted into a heavily populated area. Quickly captured, severely beaten, and trucked off to Hanoi, Stockdale spent the next seven and a half years in captivity. To paraphrase John Paul Jones, however, he had only begun to fight. During his incarceration Stockdale continually defied his captors, helped keep up the morale of fellow prisoners, and established a clandestine communications system among the American prisoners.

Stockdale's courage, dedication to duty, and leadership under great duress while in captivity earned him the Medal of Honor and the respect of a grateful nation and his fellow prisoners. After release from prison in 1973, he rose to the rank of vice admiral, served as president of the Naval War College, and ran as a vice presidential candidate in the national election of 1992. His writings and speeches about the value of honor, integrity, and perseverance inspired many. ⚓

NHHC VN Collection

Vice Admiral James B. Stockdale shows how he and fellow POWs communicated during their captivity in Hanoi. They placed aluminum drinking cups next to the walls of their cells and either listened through them or spoke into them.



NHHC VN Collection

Reconnaissance photo of a North Vietnamese surface-to-air missile battery. Navy photo interpreters have circled individual Soviet-made SA-2 Guideline missiles and their launchers.

COUNTERING THE SAMS

One of the most feared weapons in North Vietnam's air defense arsenal was the Soviet-provided SA-2 Guideline surface-to-air missile. Designated V-75 Dvina by the Soviets, the 35-foot-long, two-stage missile carried a 349-pound, high-explosive warhead. The SA-2 entered service in the late 1950s in batteries located around the cities of Moscow, Leningrad, and Baku. They shot down the U-2 high-altitude intelligence spy plane piloted by Francis Gary Powers over the Soviet Union on 1 May 1960 and the U-2 flown by Air Force Major Rudolph Anderson Jr., over Cuba on 27 October 1962. SA-2s also destroyed four Central Intelligence Agency (CIA) U-2s and an RB-57 Canberra flown on reconnaissance missions over China by Republic of China (Taiwan) air force pilots.

The Soviet Union provided thousands of missiles, launchers, and fire-control radar sets to North Vietnam during the war. Moscow also trained North Vietnamese air defense personnel in the operation of these plane killers who became especially adept at coordinating SAM and antiaircraft artillery defenses and overcoming American

NHHC VN Collection

An SA-2 missile explodes below a carrier plane sending thousands of pieces of deadly shrapnel in all directions.

Courtesy National Naval Aviation Museum

A pair of Attack Squadron 25 A-7 Corsairs, armed with AGM-45 Shrike antiradiation missiles and Mark 82 bombs carry out an Iron Hand mission in North Vietnam during 1969.

NHHC VN Collection

A Shrike air-to-surface, antiradiation missile is mounted on the wing of an A-4 Skyhawk during a 1963 evaluation of the weapon at the Navy's China Lake Naval Ordnance Test Station in California.

countermeasures in a never-ending game of cat-and-mouse.

It did not take long for these weapons to show up in North Vietnam. On 5 April 1965, an RF-8A Crusader photoreconnaissance plane from *Coral Sea* (CVA-43) brought back photos that positively identified North Vietnam's first SAM battery under construction. Discovery of the site 15 miles southeast of Hanoi was considered important enough for Rear Admiral Henry L. Miller, the Task Force 77 commander, to fly to Saigon to discuss the

intelligence with Air Force leaders. The conferees agreed that they needed to take immediate action to counter this new and dangerous threat. They forwarded a plan for a joint Navy–Air Force strike on the SAM site.

Washington rejected the proposal. The Johnson administration feared that strikes on the SAM sites would kill Soviet advisors and technicians installing the weapons and perhaps cause the Soviet Union to intervene in the war. In July naval intelligence reported a SAM site operational, and Washington finally took notice and ordered its destruction, but it was already too late. By the end of the year, 56 SAM batteries dotted the countryside around Hanoi and Haiphong.

On 24 July 1965, the North Vietnamese registered the first kill of an American plane with an SA-2 surface-to-air missile when a battery commanded by Soviet Lieutenant Colonel F. Ilinykh shot down an Air Force F-4C Phantom II some 40 miles northwest of Hanoi. The Navy's first aircraft loss to a North Vietnamese SAM occurred on 11 August 1965, when an SA-2 destroyed a *Midway* (CVA-41) A-4 Skyhawk. At this stage of the war, the North Vietnamese launched an average of 15 SAMs at every U.S. plane that flew within range, testimony to the growing amount of Soviet support to North Vietnam.

Another noteworthy loss occurred on 5 October 1965, when F-8E Crusaders from *Oriskany* (CVA-34)'s VF-162 flying combat air patrol for a strike against bridges north of Hanoi came under attack by SA-2s. One of the missiles exploded close behind the Crusader flown by Lieutenant (j.g.) Robert F. Adams. With his plane on fire, Adams made it over the gulf and ejected. Within minutes, a helicopter from cruiser *Galveston* (CLG-3) rescued the pilot. This was the first instance of a pilot surviving a SAM shoot-down. Adams' luck held the following July when antiaircraft fire downed his F-8E Crusader, and an SH-3 Sea King helicopter plucked him safely from the jungle.

One of the early approaches the U.S. air forces took to avoid SAMs called for the strike formations to fly toward the target at low level and high speed until they reached a preplanned point of identification such as a prominent landmark or bend in a river. Then the pilots would alter course to another preplanned point, pull the planes into a climb, and then dive toward the target for the release of weapons. This pop-up procedure, however, brought the planes down to the range of small arms fire. In addition, the enormous pressure on the pilot to quickly identify landmarks and the target to be attacked affected the accuracy of the strike. Pilots learned to go no lower than 4,500 feet on their attacks lest they run afoul of gunfire from the ground.

Naval aviator Lieutenant Commander Paul T. Gilchrist related how flying at either a high or a low altitude offered no refuge from enemy air defense weapons. On his first mission over North Vietnam, on 19 April 1966, Gilchrist's fellow F-8 Crusader pilots immediately dove from 8,000 feet to avoid SA-2 missiles, often characterized by the Americans as flying telephone poles. The pilot found himself feeling "naked as a jaybird up there all by myself." He soon followed suit and headed down but then realized the enemy's "trap had been neatly sprung. All 11 strike aircraft had been driven down into the killing grounds of the fiercest barrage of 37mm and 57mm artillery fire I could have imagined." Gilchrist escaped unharmed, but the squadron's commanding officer, Commander Robair F. Mohrhardt, was not as lucky. Antiaircraft fire heavily damaged Mohrhardt's F-8E, forcing him to eject over the gulf for an at-sea rescue.

The Navy soon operated planes and equipment over North Vietnam to detect, jam, and confuse the enemy's missile guidance radars. Air Force planes based in Thailand, Marine aircraft launching from Chu Lai in South Vietnam, and Navy aircraft on board carriers at Yankee Station made up the electronic warfare anti-SAM force. The Navy planes included EA-1E and EA-1F Skyraiders, EA-3B and EKA-3B Skywarriors, and later in the war EA-6B Prowlers. The Marines operated EA-6A Intruders and EF-10B Skyknights, the latter of which first saw service as night fighters in the Korean War.

These planes employed sophisticated electronic gear, referred to as black boxes, in attempts to blind enemy guidance systems and radars. The electronic countermeasures (ECM) crewmen focused their equipment on the S-band (air search), C-band

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Commander Harry B. Southworth (left), executive officer of Attack Squadron 72, receives a Silver Star medal from Rear Admiral James R. Reedy, Commander Task Force 77, for the destruction of an enemy SAM site on 26 October 1965.

(height-finding), and X-band (fire control) radar frequencies used by the North Vietnamese. The planes also dropped chaff (strips of aluminum released in the thousands) to help make it difficult for the North Vietnamese radars to detect attacking planes.

Vice Admiral Robert F. Dunn, a combat veteran of the air war, later recalled that "all that was well and good until the North Vietnamese began to launch missiles like [fireworks] over the Lincoln Memorial on the Fourth of July!" He added, "Often the sky would be full and they'd be coming from so many different directions that all one could do was ensure a constant jink and keep a constant lookout." In short, a barrage of missiles could overcome the best defenses.

The Navy had not devoted major resources to electronic warfare prior to the war. With combat joined in 1965, however, the Navy's scientific and procurement agencies went into high gear to develop and rush new and improved electronic countermeasures equipment to the fleet. In Project Shoehorn, the Navy equipped attack and fighter aircraft with a set that produced a "heart-pounding audio warning of a low-warble/high-warble tone which distinguished scanning radar from tracking [radar]." John B. Nichols, a veteran of Rolling Thunder, later observed, "For at least the first three years [of the war] the large majority of carrier planes flying over the beach were electronically naked." While other naval aviators

and ECM equipment operators had a more positive appraisal of the countermeasures effort, by the end of Rolling Thunder the Navy determined that additional measures were needed to defend its pilots and planes.

The Navy and Air Force also took the offensive against the SAM batteries. U.S. forces designated the anti-SAM operations "Iron Hand." The Navy carried out its first Iron Hand strike on 17 October 1966, when four A-4E Skyhawks from *Independence* (CVA-62) accompanied by an A-6A Intruder destroyed a SAM site near Kep Airfield northeast of Hanoi with antiradar missiles.

Some of the Navy's most skilled and fearless pilots carried out Iron Hand missions. On 20 April 1967, Lieutenant Commander Michael J. Estocin, a member of *Ticonderoga* (CVA-14)'s VA-192, led a three-plane group that destroyed three SAM sites near Haiphong. Six days later, while his Skyhawk and an escorting F-8 Crusader piloted by Lieutenant John Nichols headed for the ship after a successful strike mission, a North Vietnamese SA-2 exploded close to Estocin's plane. As witnessed by Nichols, the wounded naval aviator managed to keep his heavily damaged plane in the air for a time, but eventually he lost consciousness and the Skyhawk plummeted to the ground. Nichols, as related in his book *On Yankee Station: The Naval Air War Over Vietnam*, co-authored with Barrett Tillman, considered Estocin "perhaps the bravest man I ever knew, and one of the finest aviators." The intrepid pilot was posthumously awarded the Medal of Honor.

The weapon of choice for the Iron Hand attacks was the AGM-45 Shrike antiradar missile, which reached Task Force 77 carriers in early 1966. The weapon was specifically designed to track a radar emission beam back to the emanating equipment. The Shrike's warhead fragmented into thousands of metal shards that shredded radar antennas, nearby support vans, and operating personnel. Shrikes destroyed many SAM radars, as did the AGM-78 Standard ARM (antiradiation missile) that came into use at the end of Rolling Thunder. Enemy radar operators, however, quickly learned to adapt to the U.S. weapons and tactics. They routinely turned their radar on for only a few minutes or seconds to zero in on a plane and then turned it off to negate the missile's homing guidance. Still, by the end of the war improved antiradiation missiles, tactics, and U.S. electronic countermeasures significantly reduced aircraft losses to SAMs.

The North Vietnamese worked just as hard to improve the effectiveness of their surface-to-air missiles. The North Vietnamese positioned SAM batteries close to nonmilitary sites, such as irrigation dikes and villages, in an effort to deter air attacks. If the Americans targeted the sites and caused collateral damage, Hanoi's propaganda machine could highlight the destruction as evidence of "indiscriminate" bombing. Robert Dunn, then a commander and the commanding officer of the VA-146 "Blue Diamonds," remembered a particular mission. The photo interpreters on board *Constellation* (CVA-64) steaming in the Gulf of Tonkin in July 1967 had identified a SAM battery in the middle of a soccer stadium in Phu Ly, a city about ten miles south of Hanoi. Shortly afterward, an Alpha strike consisting of 12 A-4 Skyhawks, 4 A-6E Intruders, and 4 F-4J Phantoms struck the target. Despite heavy opposition from enemy SAM and antiaircraft guns, the strike group unleashed 750-pound bombs against the target. Dunn and the other attack pilots watched with satisfaction as their bombs fell precisely within the confines of the stadium and obliterated the SAM battery. A follow-up photoreconnaissance mission confirmed the accuracy of their initial observations.

Several days later Dunn learned about the lead story, complete with pictures, in a Hanoi newspaper: "Yankee air pirates destroy school children's football stadium!" The images showed several wrecked seats and torn up turf in the stadium. Unsurprisingly, they did not show destroyed missiles or their launchers. This was just one more chapter in North Vietnam's concerted effort to influence antiwar sentiment in the United States and on the international stage by painting the U.S. air campaign as a criminal enterprise. ⚓

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Enterprise (CVAN-65), the Navy's first nuclear-powered carrier, shapes a course in the South China Sea.

THE BOMBING CAMPAIGN HEATS UP

In late 1965 the Navy deployed two of its most advanced warships to the combat theater. On 26 November, the nuclear-propelled carrier *Enterprise* (CVAN-65) and the nuclear-powered frigate *Bainbridge* (DLGN-25) joined Seventh Fleet units operating in the South China Sea. On 2 December *Enterprise*, commanded by James L. Holloway III, a future Chief of Naval Operations, made her combat debut when Carrier Air Wing 9 aircraft struck Viet Cong positions near Bien Hoa, South Vietnam. On 11 December, *Enterprise* set a record with 165 combat sorties in a single day. And just before Christmas, planes from *Enterprise, Kitty Hawk* (CVA-63), and *Ticonderoga* (CVA-14) destroyed a North Vietnamese power plant at Uong Bi north of Haiphong. This 100-plane Alpha strike was the first raid on an industrial target in North Vietnam.

During the last ten months of 1965, Navy and Marine Corps aircraft flew more than 61,000 sorties over North and South Vietnam; and Air Force aircraft flew almost 50,000 sorties. By the end of 1965 Seventh Fleet squadrons had dropped 64,000 bombs and fired 128,500 rockets in the effort to interdict the enemy's supply lines into South Vietnam. As an example of the intensity of carrier operations during this period, when the small-deck, *Hancock* (CVA-19)-class carrier *Bon Homme Richard* (CVA-31)—the Bonnie Dick—and her Carrier Air Wing 19 returned to the United States in January 1966, both were awarded the Navy Unit Commendation for their accomplishment of 12,328 combat missions; no carrier or air wing had exceeded that number on a single deployment.

To determine if Ho Chi Minh's government was feeling the pain after ten months of Rolling Thunder, President Johnson halted bombing operations in North Vietnam from Christmas Eve 1965 to 30 January 1966. Rather than asking for terms, North Vietnam exploited the lull to strengthen air defenses; push additional troops and supplies southward; and disperse fuel, ammunition, and equipment stocks throughout the countryside.

Task Force 77 faced increasing challenges in the air war when the bombing resumed in February. Advanced, Soviet-built MiG-21 jets had already made their first appearance in the skies over North Vietnam. The MiG-21—given the U.S.-NATO codename Fishbed—was a delta-wing aircraft, which, like its predecessors from the Mikoyan-Gurevich design bureau, was noted for its simplicity and high performance. The MiG-21 was a specialized, Mach 2+ air-superiority fighter; it was highly maneuverable and relatively easy to fly. Early variants had two 30mm cannon and two Atoll air-to-air missiles, heat-seeking weapons similar to the American Sidewinder. Later MiG-21s deleted the guns in favor of four Atoll missiles with a more advanced radar. Subsequent variants carried both a 37mm cannon and radar as

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An F-4 Phantom of *Enterprise* (CVAN-65)'s Fighter Squadron 96 fires Zuni rockets at Viet Cong targets in the jungle of South Vietnam.

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An exultant Commander Harold L. Marr gives the thumbs-up sign after his shoot-down of a North Vietnamese MiG-17 on 12 June 1966 as Captain J. C. Donaldson, the commanding officer of *Hancock* (CVA-19) (seated left), looks on.

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The railroad bridge near Ninh Binh on the Day River under attack by aircraft from *Constellation* (CVA-64) in September 1966.

well as Atoll missiles, providing the plane with an all-weather capability.

The North Vietnamese MiG-21s initially kept their distance from U.S. aircraft. However, on 26 April 1966, several MiGs attacked an Air Force F-4C Phantom II escorting a pair of RB-66 Destroyer reconnaissance aircraft. The Phantom pilot fired two Sidewinder missiles at one of the MiGs, with at least one striking its target and the pilot seen ejecting from his stricken plane. This victory over the more advanced MiG-21 by the larger, supposedly less agile Phantom demonstrated that it was capable of destroying the best fighter in the Soviet arsenal. This was the first time in history that one supersonic aircraft had shot down another.

Not until June 1966, more than one year after the start of Rolling Thunder, did the Navy's other carrier-based fighter, the F-8 Crusader, register its first kill. On 12 June, Commander Harold "Hal" Marr of carrier *Hancock* (CVA-19)'s VF-211, escorting a flight of Skyhawks with three other F-8Es, sighted four MiG-17s closing for an attack. Turning toward the oncoming MiGs, Marr fired a Sidewinder that missed, but a second missile blew the MiG apart at an altitude of only 50 feet. Marr then turned his fighter toward another MiG, earning a probable kill with his 20mm cannon.

Nine days later, on 21 June, Lieutenant (j.g.) Philip V. Vampatella, Marr's wingman on the 12th, shot down another MiG-17 in one of the most dramatic aerial encounters of the war. The naval aviator was in a flight of four Crusaders covering the rescue attempt of an RF-8 recon pilot shot down earlier. Orbiting the area in low clouds, and well within the envelope of North Vietnamese air defenses, the jets waited for the arrival of a rescue helicopter.

Vampatella felt his plane shudder as he took a hit from antiaircraft fire but continued the mission.

Shortly thereafter he and his section leader, both low on fuel, prepared to break off and find a tanker orbiting over the Gulf of Tonkin. The two F-8E pilots had barely set course for the tanker when they heard a "Tallyho, MiGs!" over the radio. The remaining two Navy fighters had sighted MiG-17s approaching and were maneuvering to meet the enemy planes. Vampatella and his section leader immediately turned back to rejoin their comrades. Vampatella, however, discovered that the damage to his plane from antiaircraft fire had slowed his speed.

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A Soviet-made, delta-wing MiG-21 Fishbed fighter.

Arriving at the scene some 30 seconds behind his faster wingman, Vampatella found the other Crusaders and MiGs already joined in battle, and one enemy plane trailing and then shooting down an F-8. Angry and frustrated, the naval aviator realized that another MiG-17 was closing on his tail. Pulling his plane into a tight, diving turn, the lieutenant headed for the ground, his damaged aircraft bucking and yawing. Skimming the trees at almost 700 mph, he evaded his pursuer and then turned on the would-be attacker, who had evidently given up the chase and was heading for home. Even though his fuel supply was critical, Vampatella pressed a Sidewinder attack and watched the enemy plane disappear in a large cloud of smoke.

With only about eight minutes of fuel remaining, he found an aerial tanker, refueled, and headed for *Hancock*, steaming 60 miles farther out to sea. After landing safely on board the carrier, Vampatella was amazed to find 80 holes in his plane from antiaircraft fire. The young fighter pilot earned the Navy Cross for staying in the fight with a plane severely damaged and low on fuel.

The air war intensified in 1966 as Task Force 77 attacks edged ever closer to Hanoi and the port city of Haiphong. On 13 April, under the leadership of Commander David B. Miller, commanding officer of *Ticonderoga*'s VA-144, 11 Skyhawks and 4 Crusaders dodged heavy SAM and antiaircraft fire to drop five spans of the Haiphong highway bridge between the Chinese border and the city. Less than a week later,

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The thermal power plant at Uong Bi, North Vietnam, struck several times by Task Force 77 carrier planes.

a pair of Intruders from VA-85 led by Commander Ronald J. Hays crossed the enemy coast in the dark and destroyed the Uong Bi power plant before North Vietnamese air defenses could react. In the words of one account, "The power plant lit up like a Fourth of July display as electrical cables sent showers of sparks flying and fuel erupted in multiple explosions."

On 15 May 1966, antisubmarine carrier *Intrepid* (CVS-11) arrived off South Vietnam to serve in a limited attack role at Dixie Station. Prior to departure from the United States, the ship had beached her antisubmarine aircraft and taken on board Carrier Air Wing 10 with two A-1H Skyraider squadrons and two A-4 Skyhawk squadrons. After three months of strike operations against Viet Cong targets in South Vietnam, *Intrepid* deployed north to Yankee Station. Naval leaders beefed up her aircraft complement

on later deployments with detachments of Navy F-8 Crusaders and Marine A-4 Skyhawk "fighters" to protect the wing's attack planes from enemy MiGs.

Task Force 77's readiness to counter the threat from North Vietnam's small but capable surface navy paid off on 1 July 1966, when three North Vietnamese torpedo boats emerged from a port and moved to attack guided missile frigate *Coontz* (DLG-9) and destroyer *Rogers* (DD-876), at the time steaming some 55 miles offshore on search and rescue operations. Aircraft from carriers *Hancock* and *Constellation* (CVA-64) responded to the threat before the torpedo boats got within range of the American ships. The carrier planes sank all of the torpedo boats with bombs, rockets, and cannon fire. *Coontz* picked up 19 North Vietnamese sailors who were later exchanged for American POWs captured in South Vietnam. On 7 July, aircraft from the same carriers sank two and heavily damaged two North Vietnamese torpedo boats found near the port of Hon Gai, 35 miles northeast of Haiphong. On 6 August, A-4 Skyhawks and A-6 Intruders from *Constellation* sank four North Vietnamese torpedo boats and damaged a fifth some 50 miles northeast of Haiphong.

Following these attacks the Soviet government charged that "large caliber bullets" from the attacking American planes had struck a Soviet merchant ship in Haiphong. A U.S. spokesman denied the charge. Moscow regularly accused U.S. aircraft of inflicting damage on Soviet or neutral (usually Soviet Bloc) merchant ships. Most of these charges were false, but some were valid; dodging SAMs and antiaircraft fire in the heat of battle sometimes made it difficult for pilots to keep their weapons trained on intended targets.

To help in the air war over the North during Rolling Thunder, the Navy positioned guided missile ships on positive identification radar advisory zone (PIRAZ) stations in the northern Gulf of Tonkin. These ships—called Red Crown for their radio call sign—provided a stable and exact reference point for allied aircraft; checked out and identified the hundreds of aircraft flying daily over North Vietnam and the gulf to confirm friendly aircraft and warn of enemy planes; guided U.S. fighters to intercept MiGs (by May 1968, the guided missile cruiser *Long Beach* [CGN -9] had identified and tracked more than 500 MiG flights with her massive AN/SPS-32/33 fixed-array radars); warned American pilots who were flying too close to the Chinese border; vectored search and rescue aircraft; and with shipboard missiles, defended friendly air and naval forces. Routinely, a modern missile cruiser shared PIRAZ duties with an older, gun-armed destroyer that rode shotgun, prepared to protect the cruiser from an enemy torpedo boat attack.

One of the U.S. Navy's most potent weapons off Vietnam was the RIM-8 Talos ship-launched, surface-to-air missile. A 4,400-pound, solid-propellant rocket booster launched the 3,400-pound missile that could destroy aircraft some 100 miles away at altitudes up to 80,000 feet.

On 11 May 1966, *Long Beach*, operating in the northern Gulf of Tonkin, launched Talos missiles against North Vietnamese MiG fighters in the first—albeit unsuccessful—U.S. attempt to down hostile aircraft with surface-to-air missiles. On five separate occasions that month, North Vietnamese aircraft tried but failed to strike U.S. surface ships along the coast and lost two MiGs in the process. In contrast, on 23 May 1968, *Long Beach* fired two Talos missiles

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A Talos missile blasts skyward from a Navy cruiser during a test of the weapon's guidance system in early 1968.

two minutes apart at a pair of MiG fighters at a distance of some 65 miles. The first missile destroyed an aircraft and the second missile detonated on the falling wreckage. *Long Beach* repeated the feat against a MiG at a range of 61 miles in September 1968.

Visiting *Long Beach* during the war, Gerald E. "Jerry" Miller, who rose to the rank of vice admiral and fleet commander, remarked, "I've always said that if we could get it [a MiG] with Talos, why the hell are we going to put a guy [in a plane] over the beach up there and jeopardize him getting shot down?" He envisioned a future, now come to pass in the 21st century, in which pilotless aircraft would execute thousands of strike missions in heavily defended enemy airspace.

Historian Malcolm Muir also described another role for the Talos missile in support of U.S. air operations over North Vietnam. Beginning in the fall of 1967, the Navy modified the Talos to perform a radar-hunting mission. The Talos cruisers launched several antiradar missiles on a high-altitude trajectory out to their maximum range of some 120 miles to target North Vietnamese radars threatening U.S. air operations. "Once in action," Muir wrote, Talos missiles "reportedly shut down North Vietnamese radar installations for an entire week."

The Vietnam War saw the first combat use of another surface-to-air missile, the RIM-2 Terrier, an antiaircraft weapon that could engage targets 20 miles or more from the ship and at altitudes up to 80,000 feet. A 1,820-pound, solid-propellant rocket booster launched the 1,180-pound Terrier. The weapon was a beam-riding missile with semi-active terminal homing. Introduced to the fleet in 1955, RIM-2s armed 40 U.S. aircraft carriers, cruisers, frigates, and destroyers (as well as a number of foreign warships). Despite teething problems, the Terrier proved to be a reliable weapon. Later in the war, U.S. guided missile frigates employing the weapon off North Vietnam shot down at least three MiGs, *Biddle* (DLG-34) destroyed two planes, and *Sterett* (DLG-31) claimed another. ⚓

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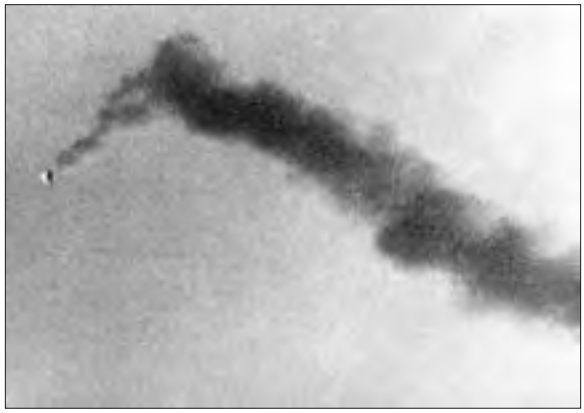
Nuclear-powered guided missile cruiser *Long Beach* (CGN-9) armed with Talos and Terrier surface-to-air missiles steams through the Western Pacific during the war.



NHHC VN Collection

The mid-air destruction of a North Vietnamese MiG-17 by a Terrier missile fired from guided missile frigate *Sterett* (DLG-31).

NHHC VN Collection

A North Vietnamese fuel vessel caught at sea off Haiphong erupts in smoke after a strike by *Constellation* (CVA-64) aircraft in August 1966.

THE POL STRIKES

In early 1966, Pentagon and CINCPAC staffs developed a plan that targeted North Vietnam's infrastructure for storing and transporting petroleum, oil, and lubricants (POL) near Hanoi and Haiphong. After weeks of vacillation, President Johnson and Defense Secretary McNamara approved attacks on 7 of 11 potential targets. They directed the Navy to use only the most experienced pilots who were to take special care not to cause collateral damage to civilians and to Soviet, Chinese, or Communist Bloc shipping in the port of Haiphong. They also dictated that the strikes could only be executed in clear weather when aircrews could make positive visual identification of their targets.

The bombing campaign against North Vietnam's POL system began on 29 June 1966. A 28-plane formation from *Ranger* (CVA-61) executed an Alpha strike, dropping their bombs on the Haiphong POL complex, which erupted in fire and smoke that rose to 20,000 feet. At the same time, *Constellation* (CVA-64) sent an attack against the smaller POL facilities on the Don Son Peninsula southeast of Haiphong. On 1 July, *Constellation* and *Hancock* (CVA-19) launched devastating strikes against fuel storage sites at Dong Nham about 13 miles northwest of Haiphong, and at Bac Giang 30 miles north of Hanoi. Aircraft from *Hancock* also attacked the only two pumping stations in North Vietnam capable of transferring petroleum from ships to storage tanks ashore. When aircraft from *Constellation* again bombed oil installations near Haiphong in early August 1966, they encountered one of the heaviest antiaircraft barrages of the Vietnam War.

The fleet also attacked and sank hundreds of North Vietnam's barges, junks, and other coastal craft employed to transport POL. The Chinese government complained on one occasion that U.S. planes sank a Chinese merchant vessel and damaged another. The U.S. State Department replied that in coastal waters vessels were presumed to be North Vietnamese, and U.S. planes attacked them only after being fired on.

As part of the POL campaign, U.S. planes staged their heaviest raids over North Vietnam on 25 August, flying 146 sorties—71 Air Force, 68 Navy, and 7 Marine. Enemy fire claimed no U.S. planes that day. In following months, the American air forces logged as many as 173 bombing missions over North Vietnam in a single day. By September the Navy and Air Force had destroyed most of the major above-ground POL storage facilities.

Despite this concerted effort by U.S. air forces, the POL campaign failed to starve the enemy war machine of fuel. The North Vietnamese responded to it with a different, but no less effective, approach to POL storage and distribution. They simply switched from storing fuel in large, vulnerable tank farms to small caches of 55-gallon steel drums located throughout the countryside. Soviet tankers began delivering POL to Haiphong in drums rather than in bulk. Hence, the POL campaign proved to be only a temporary setback to Hanoi's war effort.

In early fall 1966, with no significant POL targets left to strike, Rear Admiral David C. Richardson, the Task Force 77 commander, refocused Navy strikes on rail yards, rail and highway bridges, and rolling stock. The attack squadrons from *Constellation*, *Oriskany* (CVA-34), *Intrepid* (CVS-11), and *Coral Sea* (CVA-43) took a heavy toll of enemy locomotives, tank cars, and boxcars.

The 9th of October proved to be an especially stellar day for the carrier force. An E-2C Hawkeye warned Commander Richard M. Bellinger, the commanding officer of VF-162, and three other pilots of his F-8E squadron that MiGs were headed their way. Bellinger, who had piloted Army bombers in World War II and Navy planes in Korea, led his formation toward the approaching enemy aircraft. The commander and his flight came face-to-face with the enemy at only 3,000 feet and a dogfight ensued.

Tragedy Aboard Ship

For America's carrier warriors, one of the greatest fears during the Vietnam War was embodied in a single word—fire. In most cases, fast firefighting actions snuffed out fires and limited the damage on these ships laden with bombs, rockets, ammunition, and aviation fuel. On 7 December 1965, a fire in a machinery room on board carrier *Kitty Hawk* (CVA-63) off Vietnam killed two sailors and injured another 28. Damage control parties limited the fire's spread.

A much more serious event occurred on 26 October 1966, when a sailor mishandled a parachute flare that ignited a blaze on the hangar deck of *Oriskany* (CVA-34) operating in the Gulf of Tonkin. Firefighters battled the flames while other crewmembers jettisoned 343 bombs over the side, some of them as large as 2,000 pounds. The damage control parties saved the ship, but she suffered serious damage, and 44 officers and enlisted men perished, many from the ship's air wing. *Oriskany* made port in the Philippines for minor repairs before steaming to the San Francisco Naval Shipyard for major repairs. The carrier returned to battle off Vietnam the following June.

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Amid the wreckage of combat aircraft, firefighting teams battle the blaze that wracked carrier *Forrestal* (CVA-59) in July 1967. The tragedy provided lessons learned for the Navy's damage control training for years afterward.

Forrestal (CVA-59), on loan from the Atlantic Fleet, fell victim to fire on the morning of 29 July 1967 after only four days of combat operations. As the flight deck crew readied the second launch of the day, faulty equipment ignited a 5-inch Zuni rocket. The rocket struck the 400-gallon drop-tank of Lieutenant Commander Frederick White's A-4E Skyhawk, killing the pilot and engulfing his plane in a ball of flame. Exploding bombs knocked some men overboard. Lieutenant Commander John S. McCain III and other naval aviators had to leap from their burning planes to escape exploding ordnance and fuel fires on the flight deck.

The fire spread rapidly through the after end of the stricken ship as flames reached and exploded other aircraft fuel tanks and ordnance. Despite the obvious danger, the flight deck crew rushed forward to man water hoses and foam dispensers and to toss bombs and rockets over the side. One 130-pound lieutenant found the strength to heave a 250-pound bomb overboard. A chief petty officer equipped with only a fire extinguisher courageously ran toward a plane on fire to rescue the pilot. A sudden, massive explosion killed both of them. Many of the ship's firefighters died in the blaze. Berthing spaces immediately below the flight deck became death traps for 50 sailors as burning aviation fuel poured down.

Firefighting parties fought the flames with great courage and dedication, but their lack of sufficient training impeded and even complicated the effort. In one instance, just after a team had smothered a fire with foam, another arrived and sprayed the site with water, washing away the foam and immediately reigniting the blaze. The *Forrestal* fire became a learning experience for the Navy, and for many years afterward sailors watched the training film *Learn or Burn*, which incorporated the actual flight deck film of the catastrophe.

Nearby ships hastened to *Forrestal*'s aid. *Oriskany*, herself a victim of a tragic fire less than a year earlier, provided firefighting and medical assistance to the larger carrier via helicopters. Destroyers moved in close to spray water onto the burning carrier. Within

an hour combined firefighting efforts had contained the fire on the flight deck, but fires below deck raged for another 12 hours.

Personnel casualties and the damage to the ship and her aircraft were catastrophic. The fire claimed the lives of 134 air wing and ship's personnel and seriously injured another 161 men. The blaze destroyed 21 aircraft and damaged others. On her own power, *Forrestal* made her way home to Norfolk, Virginia, to undergo seven months of repairs and the replacement of aircraft at a total cost of $72 million. The ship rejoined the fleet to serve for another 26 years.

Courtesy National Naval Aviation Museum

Fire ravages the carrier *Enterprise* (CVAN-65) preparing off Hawaii in January 1969 to join Task Force 77 at Yankee Station.

Nuclear-propelled *Enterprise* (CVAN-65) was the third carrier to be stricken by a major fire. On 14 January 1969, she was steaming off Hawaii on an exercise before deploying to the South China Sea. The accidental triggering of a Zuni rocket quickly transformed the flight deck into an inferno of burning planes and exploding ordnance. Damage control parties battled the flames for three hours before they brought the fire under control. This conflagration killed 28 men, seriously injured 62, and destroyed 15 aircraft. Repairs to the carrier and replacement of aircraft cost $56 million. *Enterprise* returned to Yankee Station in October 1969. ⚓

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Somber and still shaken *Forrestal* (CVA-59) crewmembers watch in silence as shipmates transport ashore at the Subic Bay naval base the remains of one of the ship's 134 sailors and aircrewmembers killed in the blaze.

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Commander Richard M. Bellinger of *Oriskany* (CVA-34)'s Fighter Squadron 162 relates how he destroyed a North Vietnamese MiG-21 on 9 October 1966.

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President Lyndon B. Johnson (center), Secretary of Defense Robert McNamara (bottom right), and Admiral Thomas H. Moorer, Chief of Naval Operations (upper left), observe flight operations on board carrier *Enterprise* (CVAN-65).

Attempting to escape Bellinger's Crusader, one MiG turned sharply, dove for the ground, and headed for the safety of an airfield off-limits to American forces. He did not make it. Bellinger slowly gained on the jinking North Vietnamese plane and launched a heat-seeking Sidewinder missile. In a flash, the North Vietnamese fighter exploded in what appeared to be a thousand pieces. This event marked the Navy's first victory over the primary fighter of the North Vietnamese air force—the Soviet-built MiG-21 Fishbed.

The air campaign against ground targets in North Vietnam continued apace in the last months of 1966. On 2 December, for instance, attack squadrons from *Ticonderoga* (CVA-14) and *Franklin D. Roosevelt* (CVA-42) joined with Air Force aircraft in a 200-plane assault on the Van Dien truck depot south of Hanoi. This operation, and a repeat strike 12 days later, destroyed 75 percent of the buildings and other facilities at the site. By the end of the year, the

Yankee Station carrier force had executed 33,000 attack sorties in North Vietnam. The year, however, was also marked by the loss of 120 naval aircraft and 89 aircrewmen in Indochina air operations.

The politically based decisions made in Washington on the conduct of the air war over the North had, in the opinion of many Navy commanders at all levels, permitted the North Vietnamese regime to undertake countermeasures in time to mitigate the effects of the bombing. This was especially true of the long-debated aerial mining of Haiphong and North Vietnam's other harbors, which did not occur until 1972. Moreover, Washington added more targets to the approved bombing list but never gave approval for attacks on the coal mining facilities of North Vietnam that supplied the country's electric power plants.

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Commander David Ellison, executive officer of Fighter Squadron 24, discusses an upcoming mission in North Vietnam with fellow aviators in the squadron's ready room on board carrier *Bon Homme Richard* (CVA-31).

President Johnson's unilateral, month-long bombing halt in January 1967 again failed to prompt the North Vietnamese to talk rather than fight. The enemy used the opportunity to shore up air defenses around Hanoi and Haiphong and to push combat troops and supplies south along the Ho Chi Minh Trail.

While the air campaign had produced only limited gains by early 1967, it had cost the United States greatly in the number of aircraft lost. A Defense Department report released to the press on 9 January 1967 claimed the loss of 599 fixed-wing aircraft and 255 helicopters—a total of 854 aircraft. But in his Pentagon press conference on 15 February, Secretary McNamara revealed much higher numbers, reporting the loss in the war up to 31 January 1967 of 1,172 fixed-wing aircraft and 682 helicopters—more than double the number cited by his department the previous month. McNamara explained that the earlier numbers included only those aircraft lost in the "battle area" of Vietnam. The new totals counted losses in Laos and Thailand, planes lost while returning from missions, and from Viet Cong attacks on U.S. bases in the south.

In a subsequent breakdown, McNamara gave these statistics for air losses in Southeast Asia for all services: fighter and attack, 1,044; reconnaissance, 104; cargo/transport, 56; other fixed-wing, 207; and helicopters, 672. Interestingly, this breakdown gave an even greater total—2,083—than the number given in McNamara's statement to the press. Thus obfuscation and confusion in the "numbers game" occurred at the top levels of the national security establishment. The bottom line U.S. air losses in the Vietnam conflict were both greater than reported and greater than expected.

Secretary McNamara also stated that U.S. aircraft dropped approximately 65,000 tons of ordnance on targets in North and South Vietnam every month. This, he told the press, was sustainable as U.S. factories were producing about 600,000 tons per month and 650,000 tons were in the inventory. Not said was that much of the inventory consisted of iron bombs left over from World War II and the Korean War that were outdated, in poor material condition, and often dangerous to handle. For a time in 1966, the lack of some critical bomb parts and sufficient numbers of specialized bomb types resulted in aircraft

Courtesy National Naval Aviation Museum

Members of Fighter Squadron 162, including Lieutenant Richard E. Wyman (top row, fourth from the left) who downed a MiG-17 in December 1967, pose for a photo in front of one of their F-8 Crusaders.

launching for missions over North Vietnam with less than full loads of required ordnance.

In early 1967, Washington finally authorized attacks on North Vietnam's heavy industries and power-generation facilities, including cement factories, iron and steel plants, power plants, ship and rail repair shops, and rail marshaling yards. And the MiG bases at Kep, Hoa Lac, and elsewhere were now fair game for attack—if preceded by presidential approval. Johnson even allowed Navy and Air Force attacks, albeit under strict rules of engagement, on targets within the prohibited zones around Hanoi, Haiphong, and along the China border. In May, for instance, a small number of *Bon Homme Richard* (CVA-31) aircraft penetrated Hanoi's heavy air defenses to carry out a bold strike on the capital's electrical power plant, knocking it out of action, if only for a short time.

The Johnson administration never approved a measure strongly recommended by naval leaders throughout Rolling Thunder—the mining of North Vietnam's major ports of Haiphong, Hon Gai, and Cam Pha, through which passed war materials provided by the country's allies. On 23 February 1967, however, Washington allowed the aerial mining of

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Commander Ernest Moore registered great success in Iron Hand strikes against enemy air defenses. While evading eight SA-2 missiles aimed at his aircraft, Moore neutralized two SAM sites near Van Dinh, North Vietnam. The Navy awarded the intrepid aviator a Silver Star for this achievement.

Frustrated Warrior: Admiral Ulysses S. G. Sharp Jr.

NO AMERICAN MILITARY LEADER was more associated with the Rolling Thunder bombing campaign than Admiral Ulysses S. Grant Sharp Jr., commander in chief of the Pacific Command from 1964 to 1968. His post-retirement book *Strategy for Defeat: Vietnam in Retrospect*, published only three years after the fall of Saigon, detailed the military's intense dissatisfaction with President Johnson's and Defense Secretary McNamara's direction of the Vietnam War.

Sharp earned two Silver Star medals for valor while commanding destroyer *Boyd* (DD-544) in the Pacific theater during World War II. Command in the Korean War and service in various oceangoing and staff positions in the 1950s and early 1960s earned the strong approval of his superiors.

Despite later criticism of the Johnson administration's "flexible response" and "graduated escalation" approaches to the air war over North Vietnam, as Commander in Chief, Pacific Fleet from September 1963 to June 1964, and then in his first year as head of the Pacific Command, Sharp accommodated his civilian superiors' desires to keep the war "limited," avoiding direct Chinese or Soviet intervention. When the Joint Chiefs of Staff recommended massive bombing of North Vietnam, the mining of the country's ports, and other strong steps, the admiral developed compromise solutions that met with Johnson's and McNamara's approval.

While a naval officer in background and inclination, Sharp worked in his joint service billet to accommodate the views of his Navy, Army, Air Force, and Marine subordinates. He asserted total control of the bombing operations in most of North Vietnam and Laos but gave great latitude to his Army and Air Force subordinates in their direction of air operations in South Vietnam and southern North Vietnam. Sharp concurred with General Westmoreland's desire during the enemy's Tet Offensive of 1968 to assign "single management" of airpower in South Vietnam to an Air Force officer despite howls of protest from Marine commanders who opposed this loss of control over Marine aviation.

He began to part ways with Johnson and McNamara as it became clear from 1966 to 1968 that the administration's handling of the war was inept, costly in terms of American lives, and would not defeat the enemy. The admiral dispatched hundreds of classified messages and spoke often on secure phones to the Secretary of Defense to voice his criticism over contradictory political objectives, diplomatic bombing halts that never succeeded, and overly restrictive rules of engagement. The Pacific commander's opposition to administration policies regarding the air war first became public in a major way when he testified before the Senate Committee on Armed Services, headed by John C. Stennis (D-MS), in August 1967. Even before then, Sharp had become persona non grata to Johnson and McNamara. Their disagreements became moot when Johnson announced the end of most bombing operations in North Vietnam in March 1968, and Sharp retired on 31 July of that year.

Sharp, however, was not about to remain silent. Until his death in 2001 at age 95, Sharp, in speaking engagements, books, and articles, continued to detail how the Johnson administration had bungled the Rolling Thunder bombing campaign. ⚓

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Admiral Ulysses S. Grant Sharp Jr., Commander in Chief, U.S. Pacific Command, in his Camp Smith headquarters near Pearl Harbor, Hawaii.

NHHC VN Collection

Task Force 77 at Yankee Station in 1967, as seen from the flagship *Constellation* (CVA-64). Visible are carrier *Oriskany* (CVA-34) (center), destroyer *George K. MacKenzie* (DD-836) (left), destroyer *Rogers* (DD-876) (forward of *Oriskany*), and ammunition ship *Mt. Katmai* (AE-16) (right).

NHHC VN Collection

Coral Sea (CVA-43) ordnancemen load 250-pound bombs onto A-4 Skyhawk attack planes that are slated to take part in a strike on North Vietnam in March 1967.

the major rivers in North Vietnam's southern panhandle. Barges and other coastal craft carrying munitions southward often ducked into these rivers to avoid attack by the cruisers and destroyers of Task Force 77 conducting Sea Dragon operations off the coast of Vietnam.

The first aerial mining took place on 26 February when seven A-6A Intruders from *Enterprise* (CVAN-65), led by Commander A. H. Barie, commanding officer of VA-35, planted minefields in the mouths of the Song Ca and Song Giang. The carrier planes laid five additional minefields through mid-April, employing Mark 50 and Mark 52 magnetic sea mines and Mark 36 Destructors (magnetic/seismic mines based on 500-pound bombs). During Rolling Thunder, the Navy

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Smoke enshrouds the rail and highway bridge at Cam Pha between Haiphong and the Chinese border after an August 1967 Alpha strike by attack aircraft from *Oriskany* (CVA-34).

and the Air Force also dropped 35,000 Destructors along roads, inland rivers, and around bridges and fords where enemy logistic traffic had to concentrate to cross a waterway. Passing boats and trucks triggered the mines. While both the river mouth and river crossing mining operations initially succeeded in disrupting traffic, the enemy eventually found ways to locate and either destroy or avoid the mines. Naval commanders recognized that the Destructor would not be a war-winning weapon.

Moreover, on a psychological level naval aviators had little love for the weapons. After dodging antiaircraft fire, SAMs, and MiGs to reach target areas, the attack pilots dropped their Destructors, which quickly and soundlessly plopped into a river or mud bank; there were no satisfying explosions, fire, or smoke to mark a successful strike.

A new weapon was brought to bear against targets in North Vietnam in March 1967, when an

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An artist's drawing of a Navy air-dropped Mark 36 Destructor mine.

A-4F Skyhawk of VA-212 from *Bon Homme Richard* employed an AGM-62A Walleye, an especially accurate, television-guided, glide bomb that the pilot could launch and then immediately bank the plane out of danger. As Vice Admiral Malcolm Cagle observed, "The first launch went against a large military barracks complex at Sam Son. . . . The pilots watched the TV bomb fly straight and true into a window of the barracks, exploding within—exactly like the brochure said it would." ⚓

NHHC VN Collection

Strike by John Steel. Acrylic drawing.

AIR WAR AT ITS DEADLIEST

The heavier U.S. air operations over North Vietnam paralleled an increase in the enemy's air defense effort. In March 1967, Commander Task Force 77 declared that "the quantities of flak our pilots are getting are heavier than ever—about one-third heavier than last summer." By that time U.S. intelligence officers estimated that the North Vietnamese operated some 6,000 antiaircraft guns and missile launchers provided by China and the Soviet Union. At least 560 antiaircraft guns and 15 multiple-launcher SAM sites defended Hanoi alone. In August 1967, the enemy set new records by launching 249 SAMs against U.S. aircraft—80 missiles on 21 August alone—and shooting down 16 Navy aircraft with SA-2s and antiaircraft fire. The enemy's sophisticated early warning and command and control network significantly enhanced the air defenses of North Vietnam.

Aircraft from *Bon Homme Richard* (CVA-31) and *Kitty Hawk* (CVA-63) reached a milestone in the war on 24 April 1967 when they carried out the first airstrikes against MiG bases in North Vietnam. The Navy planes attacked Kep Airfield, less than 40 miles northeast of Hanoi, while Air Force units hit Hoa Lac, southwest of Kep. Navy F-4B Phantom IIs flying cover for the strike aircraft were credited with two probable MiG-17 kills. A few days later, on 1 May, A-4 Skyhawks from the carriers shot down two MiG-17 fighters in aerial combat and destroyed four more on the ground at Kep. Some of the MiGs shot down may have been among the 14 flown by North Korean pilots that U.S. forces destroyed during a two-month period in 1967. Unhappy with this performance, the North Vietnamese sent their surviving Korean Communist comrades back home. China and the Soviet Union trained North Vietnamese pilots, but there is scant information to confirm that Chinese or Russian pilots flew MiGs in combat over Indochina.

Earlier that summer, F-8E Crusaders from *Bon Homme Richard* had shot down three MiG-17 fighters during a raid on the oil storage area at Ta Xa 30 miles north of Haiphong. By then, pilots from the carrier had downed nine MiGs. And on 25 October, U.S. carrier pilots destroyed or damaged at least ten MiG fighters on the ground in a strike on Phuc Yen Airfield.

On 21 August, Commander Bryan W. Compton Jr., the commanding officer of VA-163 flying from *Oriskany* (CVA-34), led a strike that severely damaged Hanoi's thermal power plant. In the face of heavy antiaircraft and surface-to-air missile fire, the squadron leader remained in the target area until his charges had safely withdrawn and with a hand-held camera took photos of the smoking plant that verified the success of the mission. Compton received the Navy Cross for his combat leadership and bravery under fire. His willingness to lead from the front typified the bravery and dedication of the Navy's combat commanders, but they paid a price; 67 wing and squadron commanders and squadron executive officers lost their lives in the Vietnam War.

The next step in the effort to bring pressure against Ho Chi Minh's government occurred on 30 August 1967, when *Oriskany* planes dropped

NARA

Surface-to-air missiles such as this Soviet-made, 35-foot-long Guideline carried a powerful warhead and significantly strengthened the North Vietnamese air defense system.

Homer Smith And The Debut Of PGMs

COMMANDER HOMER SMITH, the commanding officer of *Bon Homme Richard*'s VA-212, brought the Navy into the era of precision-guided munitions (PGMs) with his combat introduction of the AGM-62A Walleye, a 1,000-pound, free-fall glide bomb equipped with a TV camera in its nose. The pilot used a cockpit-mounted monitor and crosshairs to guide the bomb to its target.

On 11 March 1967, Smith's A-4 Skyhawk and other attack and fighter aircraft moved against the enemy barracks at Sam Son. Smith released his Walleye, then stood off to observe the weapon's descent to the target. The bomb went right through a barracks window and exploded inside, leveling the building. For the next two days, Smith and his squadronmates dropped more Walleyes on other barracks and the Thanh Hoa Bridge. The weapons hit the bridge accurately but without enough explosive force to inflict permanent damage.

After a series of Walleye attacks, Rear Admiral Thomas J. Walker, Commander Carrier Division 3, declared that "for the first time in the history of naval warfare a combat commander could launch one aircraft carrying one weapon with a high degree of confidence that significant damage could be inflicted on a selected target."

The following month, Task Force 77 squadrons received President Johnson's order to destroy previously off-limits power plants, including a 32,000-kilowat power generating station in Hanoi. Ever-fearful of killing civilians, Russians, or Chinese who might be in the North Vietnamese capital, Washington demanded that the Navy employ the accurate Walleyes. Commander Task Force 77 picked the unflappable Homer Smith to lead the strike on Hanoi.

On 19 May, Smith and his wingman, Lieutenant Michael Cater, launched in their A-4 Skyhawks from the flight deck of *Bon Homme Richard* with Walleyes hanging from wing pylons. A flight of six F-8E Crusaders accompanied them to deal with any MiG opposition and to knock out SAM missile batteries and antiaircraft guns near the target. Meanwhile, to divert enemy attention from the main mission, *Kitty Hawk* squadrons attacked a truck depot south of Hanoi. With this essential support, Smith's attack aircraft made it unscathed through the air defenses encircling the capital.

Screaming low over the rooftops of Hanoi, Smith and his squadronmates spotted their target. They released their bombs, banked hard, and headed for their carrier home. The Walleyes hit pay dirt; John Colvin, a resident British diplomat, observed that no sooner had the U.S. attack jets raced from the scene than fire and smoke rose over the power plant and the ceiling fan in his office stopped dead. The next day, Colvin found the facility's main building a hollow shell and its two distinctive smokestacks piles of rubble. The North Vietnamese restored power to the capital with backup generators the following day, but Homer Smith's daring strike provided a foretaste of the tactical successes such PGMs would bring to carrier operations later in the war. ⚓

the Haiphong highway bridge southeast of the city. The plan was to isolate Hanoi and Haiphong from the rest of the country by severing their road and rail connections. Carrier aircraft destroyed one bridge and railroad yard after another, and sank dredges working to keep the water approaches to Haiphong open.

An army of tens of thousands of Chinese (among the 320,000 members of the People's Liberation Army who served in North Vietnam during the war) and North Vietnamese engineers, construction troops, and peasants worked around the clock repairing and replacing destroyed bridge spans, rail lines, and roadways. To reduce the strain on the logistic support of Hanoi and Haiphong, in August 1967 the North Vietnamese evacuated to the countryside all civilians not considered vital to the functioning of the government, civil defense, or war industries.

The air war over the North continued unabated with hundreds of carrier strikes, fighter forays,

NHHC VN Collection

A Navy technician at the China Lake Naval Ordnance Test Station affixes a Walleye TV-guided glide bomb to an A-4 Skyhawk during the weapon's prewar development.

and reconnaissance missions. Despite the loss in August 1967 of 16 Navy aircraft—six of them to SAMs—a monthly record—carrier planes kept working to isolate Haiphong from the interior. These aircraft put the four main bridges into and out of Haiphong out of commission. They also knocked out the center span of the Lang Son rail and highway bridge, only eight miles from the Chinese border. From September to December, *Oriskany*, *Constellation* (CVA-64), *Coral Sea* (CVA-43), *Kitty Hawk*, and *Intrepid* (CVS-11) fighter and attack squadrons struck ship and boat yards, dock facilities, and barges and lighters in previously off-limits areas in the ports of Haiphong, Hon Gai, and Cam Pha. By the end of 1967, Task Force 77 had carried out 77,000 combat and support sorties, far surpassing the previous year's record. This tally included over 1,000 bridges dropped or severely damaged and 700 trucks, 400 locomotives and rail cars, and 3,200 coastal and river craft destroyed. ⚓

NHHC VN Collection

As part of Operation Niagara, an F-4 Phantom from Fighter Squadron 154 drops a load of general-purpose bombs on North Vietnamese troops besieging the Marine-held base at Khe Sanh.

The massive Rolling Thunder air campaign against North Vietnam did not prevent the Communist Tet Offensive that struck South Vietnam like a thunderbolt on 31 January 1968. Viet Cong and North Vietnamese forces seized the old imperial capital of Hue and attacked four other South Vietnamese cities as well as 36 of the 44 provincial capitals. Enemy saboteurs even penetrated the U.S. embassy compound in Saigon.

President Johnson especially feared that the North Vietnamese troops surrounding the combat outpost of Khe Sanh, just south of the Demilitarized Zone might overrun the Marine base as they had done at Dien Bien Phu in 1954 in the battle against the French army. In Operation Niagara, Task Force 77 and other U.S. and South Vietnamese air forces deluged the enemy forces around Khe Sanh with a rain of bombs and rockets that decimated their ranks and eliminated any prospect of a successful ground assault on the base. Flying more than 3,000 attack sorties in support of the Khe Sanh defenders during February and March 1968, Yankee Station carrier aircraft strafed, rocketed, and bombed enemy positions, some as close as 100 yards to the U.S. base.

The weather in North Vietnam during the first months of 1968 was dismal, so the all-weather A-6 Intruders executed most of the strike operations during this period. Nonetheless, carrier aircraft concentrated their strikes on North Vietnam's panhandle and the enemy lines of communication into South Vietnam. On one occasion, the heavy rain clouds parted to reveal a 100-truck supply convoy in Laos, which Navy squadrons completely destroyed.

Supported by U.S. air and naval power, American and South Vietnamese soldiers and Marines quickly recovered from the Tet Offensive, retook all of South Vietnam's population centers, and inflicted enormous casualties on the attackers. By mid-1968, Hanoi was compelled to supplement the ranks of the Viet Cong with North Vietnamese soldiers because of the large number of Viet Cong troops that had been killed during the heavy fighting.

But Tet was a strategic victory for the enemy. Having heard only positive reports on the war from General Westmoreland and other government officials during preceding months, many Americans, including President Johnson, now considered the war unwinnable. The President and others were distressed over the high number of American casualties, the continuing malfunction of the South Vietnamese government, and Hanoi's obvious determination to fight on to ultimate victory. On 31 March 1968, a somber President Johnson delivered a televised address to the American people in which he announced a halt to bombing operations north of the 19th parallel, another offer to negotiate a cease-fire agreement with Hanoi, and his decision not to seek a second term in office. The North Vietnamese government agreed to talk and later that year met with American diplomatic officials in Paris.

After the bombing halt, the Navy and the Air Force continued to fly reconnaissance missions north of the 19th parallel to ensure that the enemy was not building up forces for another offensive. Hanoi, however, characterized the flights by unarmed Air Force RF-4

NHHC VN Collection

Napalm Along the Buffer Strip by Larry Zabel. Oil on metal.

Recce Aircraft

INTELLIGENCE ACQUIRED BY Navy, Marine, and Air Force reconnaissance planes on North Vietnam's air defenses, transportation system, and military-related infrastructure was essential to the conduct of Operation Rolling Thunder. Analysis of prestrike photography enabled planners to identify enemy SAM and antiaircraft gun batteries, where MiGs were based, and the military value of potential targets. Post-mission photo interpretation helped U.S. commanders determine the effectiveness of strike operations and decide if the target should be struck again. Moreover, aerial intelligence of enemy movements along the Ho Chi Minh Trail, of Soviet ships entering Haiphong Harbor, and of trains entering North Vietnam from China helped leaders evaluate the scope of enemy material stocks and foreign assistance.

The Navy's primary reconnaissance plane was the LTV RF-8, a variant of the Crusader fighter usually referred to as the Photo Crusader. One of the RF-8's most significant accomplishments early in the war was to confirm the existence in North Vietnam of advanced Soviet air defense weapons. RF-8A and RF-8G Crusaders served the carrier forces well during the war, despite the loss of 20 planes to enemy air defenses. The aviators who flew these planes used the apt motto, "Recce pilots go alone, unarmed, and unafraid."

Fleet operations benefited from another, even more sophisticated photo and electronic reconnaissance

NHHC VN Collection

An RA-5C Vigilante reconnaissance plane ready for launch from carrier *Independence* (CVA-62).

NHHC VN Collection

A U.S. photoreconnaissance plane flies so low and fast over this North Vietnamese antiaircraft site that gunners, some seen in the upper right of this image, have no time to react. Other American air units were not so successful evading enemy air defenses.

Phantom II and Navy RA-5C Vigilante reconnaissance planes as strike operations, so Washington called them off after a few weeks. Afterward, Mach 3, high-altitude SR-71 Blackbird aircraft carried out the reconnaissance missions usually at altitudes up to 100,000 feet, far above the effective range of the SA-2 missile. On a standard mission, a Blackbird took off from Kadena Air Base on Okinawa and landed at Takhli Royal Thai Air Force Base in Thailand after photographic runs over North Vietnam. Reconnaissance satellites and a few unmanned drones also flew missions over North Vietnam, but the poor-quality intelligence that they collected was of limited use.

Following President Johnson's curtailment of bombing operations north of the 19th parallel, U.S. Navy, Air Force, Marine, and at times North Vietnamese aircraft crowded the skies in the few miles above and below the Demilitarized Zone and over the southern waters of the Gulf of Tonkin; it was a prescription for trouble. In mid-June 1968, numerous allied units ashore and afloat reported spotting or contacting on radar at night unidentified helicopters and fixed-wing aircraft in the area. In the early morning hours of 16 June, air-launched rockets and automatic weapons fire narrowly

aircraft, the North American RA-5C Vigilante, which operated from the large-deck carriers. When *Ranger* (CVA-61) arrived off Vietnam in August 1964, on her deck was the Navy's first reconnaissance heavy attack squadron—RVAH-5 and its six Vigilantes. Originally designed as a nuclear attack aircraft—it could reach Mach 2.1 speeds—the Navy changed the mission of the plane from nuclear strike to reconnaissance when the Polaris ballistic-missile firing submarines replaced carriers as the Navy's primary nuclear attack platforms in the early 1960s.

For its new mission, the Navy fitted the RA-5C with a sensor canoe under the fuselage that contained five cameras, side-looking airborne radar, infrared mapping, and electronic countermeasures gear. The plane could also carry an electronic countermeasures package in its bomb bay in place of one of three auxiliary fuel tanks. The aircraft also boasted two wing-mounted, high-intensity strobe flashes to illuminate ground targets during night missions. Integrated operational intelligence centers introduced to the large-deck carriers just before the war downloaded an RA-5C's mission information recorded on the plane's magnetic tape equipment, along with its exposed photographic film, to rapidly produce an integrated analysis for commanders and their intelligence staffs. While North Vietnamese air defenses downed 17 RA-5Cs during the war, the Vigi squadrons collected some of the highest quality images of the enemy throughout the conflict. ⚓

NHHC VN Collection

A catapult officer prepares to give the launch signal that will propel the RF-8A Crusader photographic reconnaissance plane skyward for its mission over Laos in mid-May 1965.

missed cruiser *Boston* (CA-69) and Coast Guard cutter *Point Dume* (WPB-82325), but hit and sank a Swift boat, PCF-19, killing four crewmen and injuring others. At 0118 on 17 June, missiles exploded close aboard *Boston*, splattering the ship with shrapnel. Shortly afterward, missiles fired by aircraft on two separate occasions struck Australian destroyer *Hobart* operating as part of Operation Sea Dragon near Tiger Island north of the DMZ. The attacks killed two crewmen, wounded several others, and severely damaged the warship. Minutes later, destroyer *Edson* (DD-946) withstood another aerial attack but escaped damage or casualties.

Vice Admiral William F. Bringle, Commander Seventh Fleet, immediately launched an investigation that concluded Air Force F-4 Phantoms, whose pilots believed that they were attacking enemy helicopters, had launched the Sparrow air-to-air missiles that struck *Boston* and *Hobart* on the 17th. While other Air Force planes in all likelihood carried out the 16 June strikes on *Boston* and PCF-19, there is some suggestion that enemy helicopters might have been involved. Regardless, the multiple attacks demonstrated that even though Air Force and Navy commands had taken preventative measures after a similar air assault on Coast Guard cutter

NHHC VN Collection

Naval leaders of Rolling Thunder, left to right, Vice Admiral William F. Bringle, Commander Seventh Fleet; Admiral John J. Hyland, Commander in Chief, Pacific Fleet; and Captain H. E. Greer, commanding officer of *Hancock* (CVA-19), observe flight operations from the carrier's bridge.

NHHC VN Collection

On 1 November 1968, Captain W. R. Flanagan, commanding officer of *Constellation* (CVA-64), informs his crew that Washington has ended the three-year-long Rolling Thunder bombing campaign.

Point Welcome (WPB-82329) in August 1966, interservice coordination remained a problem. Both services took immediate action to correct command and control problems. The events of 16 and 17 June 1968 proved to be an aberration in the generally positive conduct of operations involving U.S. ships and aircraft for the remainder of the war.

The air war south of the 19th parallel witnessed no let-up in combat. On 19 September 1968, northwest of Vinh, Lieutenant Anthony J. Nargi piloting an F-8C from *Intrepid* (CVS-11)'s VF-111 shot down a MiG-21, the Navy's last aerial victory in Rolling Thunder and the war's last victory for a Crusader.

Navy fighter and attack aircraft had accounted for 32 MiGs and two AN-2 biplane transports during the campaign. Air Force planes had downed 81 MiGs from 1965 to 1968. Sidewinder and Sparrow air-to-air missiles accounted for all but a few of the Navy kills. Crusaders scored only one of their victories by gunfire alone; the gunless Phantoms accomplished all 13 of their kills by missile. A-1H Skyraiders and an A-4C Skyhawk—attack aircraft—scored improbable MiG kills with gunfire and unguided Zuni rockets.

Washington prohibited the Navy and the Air Force from striking targets in most of North Vietnam after 31 March 1968. Nonetheless, until the end of Rolling Thunder on 31 October of that year, Task Force 77 carriers and surface warships and Air Force units concentrated their firepower on the region between the 18th and 19th parallels and southern Laos. The reason for that mission was clear: Communist forces in South Vietnam launched so-called mini-Tets in the spring and fall of 1968 that needed to be starved of troop reinforcements, weapons, and ammunition. In this campaign, naval units mined rivers and ports and bombarded railway and highway bridges, truck parks, fuel dumps, roads, ferry crossing points, and barges shuttling down the coast.

NHHC VN Collection

A sailor from carrier *America* (CVA-66) scrawls a message to the enemy in South Vietnam, often referred to as "Charlie" from the phonetic alphabet for Viet Cong (VC or Victor Charlie).

Vice Admiral Bringle zeroed in on three critical logistic chokepoints in the south around Vinh, Phu Dien Chau, and Ha Tinh. In August, he concentrated the attacks of his carrier air wings and Sea Dragon surface ships against Ha Tinh alone. In around-the-clock operations, the naval forces thoroughly jammed the enemy's truck traffic heading south and destroyed or damaged more than 600 of the stranded vehicles. At the same time, the fleet knocked out almost 1,000 coastal vessels. By the end of Rolling Thunder, this Navy and Air Force interdiction campaign, along with hard fighting by U.S. and South Vietnamese troops, had frustrated the enemy's yearlong effort to win the war in the South. ⚓

NHHC VN Collection

Attack Squadron 85 ordnancemen prepare to lift and attach a 500-pound bomb to a wing station of an A-6A Intruder during the spring of 1968.

Navy Art Collection

USS America by Orlando S. Lagman. Oil on canvas.

LEARNING FROM THE ROLLING THUNDER EXPERIENCE

President Johnson halted all combat operations against North Vietnam on 31 October 1968 in a last desperate hope that this would energize cease-fire negotiations in Paris, up to that point unproductive, and salvage the legacy of his presidency. It was not to be. The Rolling Thunder campaign under his direction failed to end Hanoi's support of the insurgency in the South, failed to destroy the enemy's war-making capacity, and failed to prevent the North Vietnamese Army from deploying in strength to fight American and allied troops to a standstill in South Vietnam. Distracted by domestic priorities, unprepared for his responsibilities as commander in chief, misled by poor advice from Defense Secretary McNamara and other civilian and military advisors, and inclined toward the micromanagement of military operations, Johnson oversaw a doomed bombing effort.

The Rolling Thunder campaign did not fail for lack of effort or resources. During the three and a half year aerial assault, Navy and Marine aircraft flew 152,399 attack sorties against North Vietnam, just short of the Air Force total of 153,784 attack sorties. These U.S. strikes dropped 864,000 tons of bombs and missiles on North Vietnam. This total compared with 653,000 tons of conventional bombs unleashed during the three years of the Korean War, and the 503,000 tons dropped in the Pacific theater during more than three years of World War II.

In the Vietnam War, enemy action and accidents claimed 1,125 Navy and Marine fixed-wing aircraft and helicopters, the greatest number during Rolling Thunder. Six hundred Navy and 271 Marine aviators were lost during the war, most of them in the three and a half years of the air campaign. The North Vietnamese and Chinese captured 170 naval aviators and aircrew, 160 of whom Hanoi released in 1973.

The Navy emerged from the Vietnam conflict, and in particular from Rolling Thunder, as a combat-hardened force prepared to fight limited, nonnuclear wars and to project naval power ashore. The carriers and surface warships of Task Force 77 had become potent instruments of national power. The Navy that executed the Linebacker operations against North Vietnam only three and a half years after the close of Rolling Thunder, demonstrated that the service had learned well from the experience. The service benefited from the actions of military leaders in Washington and Pearl Harbor, including Admiral Thomas H. Moorer, Chairman of the Joint Chiefs of Staff, and Admiral John S. McCain Jr., CINCPAC, who worked with the White House to set clear objectives for the Linebacker campaign. In 1972, the National Command Authority directed the U.S. military to help the South Vietnamese armed forces defeat the Communist Easter Offensive, to continue the defense of the Republic of Vietnam, and to compel North Vietnam to seriously negotiate an end to the war.

In contrast to earlier operations, in Linebacker naval commanders had much greater freedom to select targets and to use the tactics, planes, and ordnance that they believed would be the most effective. President Richard M. Nixon, who took office in January 1969, finally authorized an action that naval leaders had unsuccessfully advocated throughout Rolling Thunder—the isolation of North Vietnam from seaborne supply. On the morning of 8 May 1972, carrier-based aircraft mined North Vietnam's primary port, Haiphong, and in the weeks afterward the other ports through which the North Vietnamese imported 85 percent of the munitions they needed to fight the war. For the duration of the conflict, no merchant ships steamed into or out of the country.

For Linebacker, the Navy concentrated an unprecedented number of aircraft carriers—six—in the Gulf of Tonkin. Aircraft from these ships mounted around-the-clock strikes against the enemy's supply lines in the panhandle of North Vietnam. Commander Task Force 77 put more emphasis on surgical strikes by state-of-the-art A-6 Intruder attack planes using laser-guided bombs,

electro-optical glide bombs, and other smart weapons, rather than the previous, large-scale Alpha strikes. In the campaign, Navy and Air Force planes smashed bridges that the services had failed for years to destroy with earlier PGMs and iron bombs. New, upgraded air-to-surface missiles with electronic and optical guidance devastated enemy radar and surface-to-air missile sites.

Veteran Navy pilot John Nichols in his book *On Yankee Station* related how the new operational management of air operations influenced the morale of his fellow naval aviators:

> Spirits took an immediate upturn. We felt as though we were finally at war. More lucrative targets were opening up almost daily after four dreary years. . . . In under eight months the war Up North [in North Vietnam] had turned around. Fleet aviators saw the dramatic change on every trip over the beach. SAMs became almost nonexistent, and AAA [antiaircraft artillery] dribbled off from 85mm barrages to a token squirt here and there of 23- or maybe 37mm. Few supplies were getting in. Little was moving on the ground, for bridges and rail lines were shattered. When Air Force F-4s finally toppled Thanh Hoa Bridge [the "Dragon's Jaw"] with smart bombs, we knew we had it knocked.

The operational experience of Rolling Thunder spurred the Navy to reinforce its carrier air wings with more advanced fighter, attack, and reconnaissance aircraft, and to redirect the older aircraft to missions in the less heavily defended skies over South Vietnam. F-4 Phantom IIs, A-6 Intruders, A-7 Corsair IIs, and RA-5C Vigilantes became the primary aircraft for operations over the Red River Delta of North Vietnam, while the Navy assigned bombing and SAR support missions in the South and in Laos to the older A-4 Skyhawks and propeller-driven A-1 Skyraiders. The EA-6B Prowler electronic countermeasures aircraft helped reduce Navy air losses. By the start of Rolling Thunder, the Navy had deployed improved air-to-air missiles, including upgraded Sidewinders and so-called dogfight Sparrow radar-guided weapons.

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F-4 Phantom fighters and A-7 Corsair attack aircraft (right background) of *America* (CVA-66)'s Carrier Air Wing 6 form up for an Alpha strike against targets in North Vietnam during the waning days of the Rolling Thunder bombing campaign.

The bombardment of North Vietnam's coastal installations, highways, and waterways by the Seventh Fleet's cruisers and destroyers added to the enemy's woes. By 1972, these warships and their sailors on the gun line had become skilled at putting timely, accurate, and coordinated fire on targets along the coast of North Vietnam. These ships badly hurt North Vietnamese armor and infantry units moving south along the coast to attack Hue during the Easter Offensive. The same day the carrier force mined Haiphong harbor, three destroyers neutralized the enemy's coastal batteries on the Do Son Peninsula while guided missile cruisers *Oklahoma City* (CLG-5) and *Providence* (CLG-6) defended them against air attack. Heavy cruiser *Newport News* (CA-148) then moved close inshore and her 8-inch guns bombarded military sites 17 miles away on the transportation routes to Hanoi. Seventh Fleet ships firing Talos surface-to-air missiles shot down MiGs far inland, and with Terrier missiles, brought down MiGs that ventured out to sea.

Throughout the Cold War, the Navy was concerned about the threat posed by the Sino-Soviet bloc's large fleet of missile- and torpedo-armed fast attack craft similar to those that attacked destroyer *Maddox* (DD-731) in August 1964. The destruction, by naval aircraft, of such enemy combatants at sea,

along the coast, and at shore bases in August 1964, July 1966, and later during Rolling Thunder put many of those fears to rest.

The Linebacker campaign also marked the first test of the Navy's "Top Gun" school. Displeased by the at-times 2-to-1 ratio of Navy aerial victories-to-losses during Rolling Thunder, the Navy directed Captain Frank Ault, a veteran naval aviator, to investigate the situation. His study made clear that the prewar focus of F-4 Phantom crews—unlike F-8 Crusader pilots—on preparing for air combat at long ranges and with radar-guided missiles had dramatically reduced their skills for close-in dogfighting. Armed with Ault's report, the Navy established the Fighter Weapons School at Naval Air Station Miramar in California. The school spent the next three years training pilots who honed their abilities in air combat at close quarters. The air-to-air tally by the end of Linebacker operations confirmed the wisdom of the Navy's foresight; Task Force 77's fighters registered a 12-to-1 ratio of victories to losses.

By 1972 the Navy had posted in the northern Gulf of Tonkin positive identification radar advisory zone ships crewed by highly trained personnel and fitted with the most advanced radar and communications equipment available. Linebacker reaffirmed the value of the PIRAZ concept. For example, Senior Chief Radarman Larry Nowell, in cruiser *Chicago* (CG-11) earned the Navy Distinguished Service Medal for enabling the air-to-air destruction by U.S. planes of 12 MiGs over North Vietnam.

The *Oriskany* (CVA-34), *Forrestal* (CVA-59), and *Enterprise* (CVAN-65) fires during and in the year after Rolling Thunder reaffirmed the knowledge of the importance of damage control on board these warships loaded with volatile fuel and munitions. Without the bravery and professional skill of the damage control parties in these ships, the carriers might have been lost. The fires also served as learning tools in the Navy for years afterward. No similar conflagrations have occurred in the Navy since the end of the Vietnam War.

Hence, despite the Johnson administration's mismanagement of the Rolling Thunder campaign that ended in failure—at great cost in American lives and resources—the Navy professionally executed its mission to project naval power ashore. Task Force 77's attack squadrons supported by fighters, reconnaissance aircraft, electronic warfare planes, and the ships of the fleet almost always got through to hit their targets with devastating effect. Entering the war with in some cases inadequate aircraft, weapons, equipment, and tactics, the Navy expedited the dispatch to Task Force 77 of new, advanced equipment and better trained aviators. Naval leaders, combat commanders, and sailors of all ranks learned from their mistakes to hone a superior instrument of war that helped compel the enemy to negotiate an end to the long, costly Vietnam War. ⚓

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Combat veteran *Hancock* (CVA-19), one of several Task Force 77 carriers that pummeled Communist forces in Indochina during the allied post-Tet counteroffensive, steams through the Western Pacific.

Acronyms

AAA	antiaircraft artillery
AFS	combat stores ship
AGM	air-to-ground missile
AN/SPS	shipboard air-search radar
AOE	fast combat support ship
ARM	antiradiation missile
BB	battleship
CA	heavy cruiser
CAG	guided missile heavy cruiser
CG	guided missile cruiser
CGN	guided missile cruiser (nuclear)
CIA	Central Intelligence Agency
CINCPAC	Commander in Chief, Pacific
CINCPACFLT	Commander in Chief, Pacific Fleet
CLG	guided missile light cruiser
CVA	attack aircraft carrier
CVAN	attack aircraft carrier (nuclear)
CVS	antisubmarine warfare support aircraft carrier
CVW	carrier air wing
DD	destroyer
DIANE	digital integrated attack system
DLG	guided missile frigate
DLGN	guided missile frigate (nuclear)
DMZ	demilitarized zone
ECM	electronic countermeasures
MACV	Military Assistance Command, Vietnam
MiG	fighter aircraft designed by Mikoyan-Gurevich bureau
PCF	fast patrol craft
PGM	precision-guided munition
PIRAZ	positive identification radar advisory zone
POL	petroleum, oil, and lubricants
POW	prisoner of war
RIO	radar intercept officer
RVAH	reconnaissance heavy attack squadron
SAR	search and rescue
SAM	surface-to-air missile
UNREP	underway replenishment
VA	attack squadron
VAH	heavy attack squadron
VF	fighter squadron
VMF	Marine fighter squadron
WBLC	waterborne logistic craft
WPB	Coast Guard cutter

The Authors

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