

NORTH AMERICAN AEROSPACE MUSEUM

FLIGHT PLAN

OCTOBER NEWSLETTER

World War II Edition



D-Day Airborne Drop

World War II

BILL KOLB

FLIGHTPLAN EDITOR, MONDAY DOCENT

This issue of FlightPlan is our World War II edition. The cover is a C-47 a few minutes after midnight on June 6, 1944, inbound with the American airborne. The articles that follow stay with that war: how it started, the airplanes that fought it, and a handful of the decisions that turned local campaigns into one global conflict.

“The Road to War” is the place to begin. It runs from the punitive peace of 1919, the collapse of the German economy, Hitler’s rise, the failure of appeasement, and losses at Poland, France, and Dunkirk. On the other side of the world, it follows Japan from Manchuria & China, the oil embargo against Japan, and ultimately to Pearl Harbor. By mid-December 1941, the United States was at war with both Japan, Germany & Italy. The rest of the issue is the air war that came out of that collision.

The American section centers on airplanes in the story, and in several cases in our collection. Our C-47 carried paratroopers on D-Day. Our Tulsa-built A-26 Invader attack bomber. The P-51 Mustang that took the heavy bombers to Germany and brought the crews back. The PBV Catalina hunted submarines, found the Japanese fleet, and rescued men from the water. And the Texan that trained the pilots who flew many of the above.

The Axis section turns to the other side of the same sky: Germany’s Me 262, the first operational jet fighter, and the Fw 190, the Luftwaffe’s tough radial-engined fighter.

Around those aircraft are the campaigns, locations, and strategies that shaped the war. Midway, both the battle and the intelligence that led to our victory. The coral runways of Tinian Island and the B-29s that flew from there to deliver the weapons that ended the war. The D-Day airborne drop and the weather call Eisenhower had to make before anyone landed. Then, late in the war, the Battle of the Philippine Sea, and the mission that shot down Admiral Yamamoto.

The war was fought on the ground and at sea. In these pages it is fought in the air. ✈

GUIDELINES FOR SUBMITTING ARTICLES TO FLIGHTPLAN

1. The FlightPlan (FP) is published on the 1st of each month
2. Stories for the next issue can be filed up to the 10th of the prior month
3. Articles should be associated with an artifact at the Museum
4. Sources for specific information in the article should be provided
5. Stories should be approximately 500 words long
6. If appropriate, include one or two photos for publication with the article
7. Include name, day, and title at the bottom of each article submitted
8. Email articles to: **flightplan@evergreenmuseum.org**
9. Feedback is encouraged; submit to **flightplan@evergreenmuseum.org**

SCOT LANEY

MUSEUM CEO

Welcome to the WWII issue. Bill Kolb shared a preview with me, and I think this issue has a little something for everyone, all good topics parsed from the litany of subjects we collectively lump together as the World War Two. Or, if you think about it, the predictable Act II of World War One, scripted for the whole world in the Treaty of Versailles.

My grandpa used to say that you can beat a racoon, but you better feed it after that or it will gang up with other racoons and hunt you down in the night. When they wrote the Treaty of Versailles they missed that sage advice.

World War Two is a prime example of the way that all events flow in currents, those currents collide and merge in ways expected and unexpected, eventually forming an ocean of information, stories, odd associations and improbabilities-all of which we then refer to as “history” with many single topics therein worthy of our attention. Just the WWII large issues, the famous engagements, the very large personalities of Allied and Axis leadership, the equipage of the effort, the internal political strife (like Elenor and Truman’s War within a War), the insertion of Russian spies at all levels of the Manhattan project- all of these can provide a lifetime of study to anyone that wants to take them on.

Sort of like our entire museum if you think about it. The endless supply of stories all our artifacts tell, some close to the object and others removed a few degrees but all part of the narrative.

Enjoy!





The Road to War

BILL KOLB

MONDAY DOCENT

Summary

The harsh peace imposed on Germany after the First World War, combined with economic collapse, created the conditions in which Hitler and the Nazi Party rose to power. Their racial ideology and rapid rearmament produced the Sudetenland crisis and the failure of appeasement, culminating in the invasion of Poland, the fall of France and the Low Countries, and the evacuation at Dunkirk. In the Pacific, Japan's drive for resources and imperial dominance led to war in China, the occupation of Indochina, and an oil embargo that pushed Tokyo toward Pearl Harbor. By mid-December 1941, the United States was at war with both Japan and Germany, and the conflicts in Europe and Asia had become a single global struggle.

Germany's Rise from the Ashes

When the First World War ended in November 1918, the victorious powers met at Versailles to settle the peace. The treaty signed in 1919 was deliberately punitive. Germany was forced to accept sole responsibility for the war, lost significant territory, saw its army limited to 100,000 men, was forbidden to use modern weapons, and was burdened with reparations so heavy they seemed designed to keep the nation weak for decades. The German economy, already devastated by four years of total war, collapsed. Hyperinflation in the early 1920s wiped out middle-class savings. The Great Depression that followed a few years later drove unemployment to catastrophic levels. Millions of Germans, many of them veterans, searched for someone who could restore national pride and put the country back on its feet.

Adolf Hitler and the National Socialist German Workers' Party stepped into that opening. They offered clear enemies and simple solutions: the Treaty of Versailles was a national disgrace, Jews and Communists were to blame, and only a strong Germany under firm leadership could recover. The Nazi program went far beyond resentment and economic pain. It rested on a rigid racial hierarchy, the demand for living space (Lebensraum), and the determination to eliminate those the party defined as enemies of the German people. Hitler became Chancellor in January 1933. Within months, the Weimar Republic was gone. Political opponents were sent to concentration camps, the free press was silenced, and the Nazi Party became the only legal political organization in the country.

Rearmament began quietly, then became open after 1935. Conscription returned. The Luftwaffe was created. German industry turned toward war production under the Four-Year Plan. The limits imposed at Versailles were ignored while

(CONTINUED NEXT PAGE)

The Road to War

(CONTINUED FROM PREVIOUS PAGE)

Britain and France hoped that limited concessions would keep Hitler satisfied.

That hope was tested in 1938 over the Sudetenland, the German-speaking border regions of Czechoslovakia. Hitler demanded the territory and threatened war. Britain and France, still haunted by the losses of 1914–1918 and unprepared for another major conflict, chose to yield. At Munich in September 1938, Neville Chamberlain and Édouard Daladier agreed to hand over the Sudetenland without consulting the Czech government. Chamberlain returned to London holding a piece of paper and declaring he had secured “peace for our time.” Within six months Hitler occupied the rest of Czechoslovakia. Appeasement had failed.

In September 1939, Germany invaded Poland. Britain and France declared war but could do little to stop the advance. The following spring, German forces struck across Western Europe. Denmark and Norway fell in April. In May, the main attack hit the Low Countries and France. Panzer units drove through the Ardennes, bypassing the Maginot Line, while the Luftwaffe controlled the skies. The British Expeditionary Force and large French formations were pushed back to the Channel and trapped around Dunkirk.

Between May 26th and June 4th, 1940, nearly 340,000 British and Allied troops were evacuated from the beaches under constant air attack. Destroyers, merchant ships, and hundreds of small civilian boats carried them to England. The army was saved, but it left behind almost all its tanks, artillery, and vehicles. France surrendered a few weeks later. Britain stood alone.

Japan and the South Pacific

While Europe went to war, another conflict was building in the Pacific. Japan had industrialized rapidly but lacked critical resources, oil, rubber, and strategic metals. Expansion was driven by more than economics. It was also fueled by an imperial ideology, a belief in Japanese superiority over other Asian peoples, and the conviction that Japan had both the right and the duty to dominate East Asia. In 1931, Japanese forces seized Manchuria. Full-scale war with China began in 1937. The fighting was extraordinarily brutal. The worst episode was the Rape of Nanking in December 1937 and early 1938, when Japanese troops killed hundreds of thousands of Chinese civilians and prisoners of war and subjected the population to widespread rape and destruction.

Japanese forces continued south. By 1940–1941, they moved into French Indochina, positioning themselves to seize the resource-rich areas of Southeast Asia and the Dutch East Indies. The United States, already aiding China and alarmed by Japanese expansion, increased economic pressure. In July 1941, after Japan occupied southern Indochina, Washington froze Japanese assets and cut off almost all oil exports. Britain and the Netherlands followed suit. Japan’s remaining oil reserves would last only a few months. Japanese planners concluded that war with the Western powers was necessary to secure the resources they needed.

On the morning of December 7, 1941, Japanese carrier aircraft attacked the U.S. Pacific Fleet at Pearl Harbor. Eight battleships were sunk or damaged, nearly 200 aircraft were destroyed, and more than 2,400 Americans were killed. The American aircraft carriers were at sea and escaped destruction. The attack brought a previously divided United States fully into the war.

Declaration of War

President Roosevelt delivered his famous “December 7th, 1941, a date which will live in infamy” address and asked Congress to declare war. Congress declared war on Japan the following day, December 8, 1941. Roosevelt signed the declaration within hours. Germany declared war on the United States on December 11. Congress responded that same day by declaring war on Germany and Italy. The wars in Europe and Asia were now one global conflict. ➤

USA

BRITAIN

FRANCE

OTHER

FLIGHT PLAN

AMERICAN SECTION





Douglas C-47 Skytrain

The Airplane That Carried the Airborne War

BILL KOLB

MONDAY DOCENT

Summary

The Douglas C-47 Skytrain was the military transport that made Allied airborne warfare possible. Built from the DC-3 airliner, it carried paratroopers, towed gliders, and hauled cargo, wounded men, and fuel from 1942 to the end of the war. The Army Air Forces called it the Skytrain. The Royal Air Force called the same airplane the Dakota. The United States built more than 10,000. On the night of June 5–6, 1944, C-47s led the invasion of Normandy. No other Allied transport did more unglamorous work to keep armies moving.

Design and Production

The line began with the Douglas DC-3, which first flew on December 17, 1935, and then rewrote airline economics. A low-wing monoplane with two Pratt & Whitney radials, a stressed-skin fuselage, and retractable landing gear, it could make money on a passenger route without a mail subsidy. The Army had already bought the earlier DC-2 as the C-33 and C-39. In 1940 it ordered a purpose-built transport, the C-47.

The military airplane kept the DC-3 wing, tail, and Twin Wasp engines and changed what mattered: a cargo hold. The floor was reinforced. A large cargo door was cut into the left rear fuselage, with a smaller passenger door

set into it. Tie-down fittings ran the length of the cabin. A hoist could be fitted at the door. The airline interior came out. In its place went fold-down metal seats along the walls, enough for about twenty-eight paratroopers with their gear, or about twenty-seven stretchers when the airplane was rigged as an ambulance. Two 1,200-horsepower Pratt & Whitney R-1830 engines gave a cruising speed



(CONTINUED NEXT PAGE)

Douglas C-47 Skytrain

The Airplane That Carried the Airborne War

(CONTINUED FROM PREVIOUS PAGE)

near 160 mph and a range of about 1,600 miles with a normal load. The useful load was roughly 6,000 pounds. Wingspan was 95 feet. A crew of three- pilot, copilot, and radio operator- flew it, with a crew chief riding in the cabin.

Douglas built the C-47 at Long Beach and the C-47A, the most numerous model, at Long Beach and at a new plant in Oklahoma City. The C-47A added a 24-volt electrical system. The C-47B was fitted with two-speed superchargers for the high passes of the China-Burma-India theater. The C-53 Skytrooper was a dedicated troop version without the full cargo door. Britain, Canada, Australia, and other Allied air forces received the type as the Dakota. Licensed copies were built in the Soviet Union as the Lisunov Li-2 and in Japan as the Showa L2D. American production of the C-47 family passed 10,000 aircraft.

It was not fast, and it was not armed in any serious sense. It had a wing that would fly when it was heavy, overloaded, or damaged, and a structure that maintenance crews in the field could patch. Pilots said it would take off with more than the book allowed and bring them home with pieces missing. That reputation was earned.

Wartime Service

The C-47 entered squadron service in 1942 and went everywhere the Allied armies went. In the Pacific it supplied island garrisons and, on the Hump route over the Himalayas, carried fuel and cargo from India into China when the Burma Road was closed. In the Mediterranean, it dropped paratroopers on Sicily in July 1943 and towed gliders into the assault.

Those early drops were costly and poorly controlled. The lessons went into the training program for the troop carrier groups that would lead the invasion of France.



D-Day Crew of Our Aircraft

Back Row, left to right:

Intelligence officer riding as an observer
First Lieutenant William E Grundy, Pilot
2nd Lieutenant Brad F Randolph, Navigator
2nd Lieutenant Clark S Peterson, Co-Pilot

Front Row, left to right:

Tech Sergeant Bill D Michael, Crew Chief
Staff Sergeant Stanley Yeats, Radio Operator



On the night of June 5, 1944, more than 800 C-47s of the IX Troop Carrier Command left England carrying the American 82nd and 101st Airborne Divisions. Pathfinders went first, a few minutes after midnight, to mark the drop zones. The main streams followed. The same airplane towed the Waco CG-4A gliders that landed the heavier weapons at dawn. British Dakotas did the same work for the 6th Airborne Division on the eastern flank. Scattered drops, flak, and cloud meant many sticks landed far from their zones. The C-47 still put the equivalent of two divisions on the ground behind the beaches in one night.

(CONTINUED NEXT PAGE)

Douglas C-47 Skytrain

The Airplane That Carried the Airborne War

(CONTINUED FROM PREVIOUS PAGE)

The pattern was repeated. In September 1944, C-47s lifted the British 1st Airborne Division and the American 82nd and 101st into the Netherlands for Market Garden and then flew resupply into the pocket at Arnhem under fire. In March 1945, Operation Varsity, the crossing of the Rhine, was the war's largest single-day airborne operation. In Burma, Dakotas dropped the Chindits and kept Merrill's Marauders and Wingate's columns supplied. By 1945, the troop carrier groups also served as the air evacuation service, bringing wounded men back to hospitals in England and the United States.

After the war, the Skytrain did not retire. As the C-47D, and later in small numbers as the AC-47 gunship in Vietnam, it kept flying. Airlines bought the surplus by the hundred. Many were still at work eighty years after the first DC-3 flew. The airplane designed to make a profit on a passenger route became the transport that carried the airborne war.

About Our Artifact

The museum's airplane is a Douglas C-47A Skytrain, serial 43-15512, built by Douglas at Long Beach in 1944. It served with the 89th Troop Carrier Squadron, flying from RAF Greenham Common in England.

On June 5, 1944, the squadron took off at 23:48 for Drop Zone A, near Sainte-Mère-Église, carrying men of the 101st Airborne Division's 502nd Parachute Infantry Regiment. The drops were made at about 700 feet, under radio blackout, in overloaded airplanes, with low cloud and drop zones that were not yet marked. The

regiment's task was to hold the northern causeways off Utah Beach and destroy a German battery of 122 mm howitzers.

The same airplane stayed with the squadron for the rest of the campaign. In July 1944, the 89th moved to Italy for Operation Dragoon, the invasion of southern France, and in August dropped troops inland of the Saint-Tropez beaches. On September 17, it dropped paratroopers and released gliders in Operation Market Garden, then flew resupply on September 20 and 21. Near Christmas, it carried supplies into Bastogne for the 101st. In February 1945, the squadron moved to France. In March, 43-15512 released gliders in Operation Varsity, the airborne crossing of the Rhine.

At the end of the war, it flew repatriation missions. Crews carried Soviet prisoners and refugees as far as Berlin and were not allowed to take them farther. The airplane landed twice on the road outside Bergen-Belsen to bring internees out for medical treatment. The people it carried had nothing to give the crew except pebbles from the road and buttons from their clothes. Between April and June 1945, the IX Troop Carrier Command flew out 273,843 repatriates.

After the war, 43-15512 was converted to a DC-3C, registered N62376, and flew for Empire Airlines and then West Coast Airlines on the Boise, Spokane, Seattle, and Portland routes. It logged more than five million miles with West Coast and 32,181 hours between June 1944 and its retirement on June 9, 1963. In 1966, the Oregon Museum of Science and Industry received it. In the early 1990s, it was restored and brought to our museum where it is undergoing a full restoration from the bare metal out. ➤

Douglas A-26C Invader

The Last Attack Bomber



BILL KOLB

MONDAY DOCENT

Summary

The Douglas A-26C was the glass-nosed Invader: a fast attack bomber with a bombardier and Norden sight. Sister A-26Bs used solid gun noses. The type fought in World War II, Korea, and Vietnam. Museum airframe 44-35439 left Tulsa in 1945 as an A-26C and now wears A-26B markings as Margie.

Design and Production

Ed Heinemann's team at Douglas designed the Invader to replace the A-20 Havoc. The XA-26 first flew on 10 July 1942 and beat every performance guarantee. Two Pratt & Whitney R-2800 Double Wasps of 2,000 horsepower each gave a top speed near 355 mph—faster than the B-25 Mitchell or Martin B-26 Marauder—while the airplane could carry up to 6,000 pounds of bombs. Laminar-flow wings, slotted flaps, and remotely aimed dorsal and ventral turrets were advanced for a 1942 attack bomber.

Two noses defined the family. The A-26B had a solid “gun nose” with six or eight .50-caliber machine guns for low-level strafing. The A-26C had a transparent bombardier nose with a Norden bombsight and two fixed forward guns. Crews could swap noses in a few hours and change the airplane's job. Douglas built 1,091 A-26Cs, almost all at Tulsa (the “DT” blocks), and 1,355 A-26Bs. Total Invader production was about 2,452. Late C-models added wing guns, extra fuel, and underwing rockets.

The A-26 reached Europe in late 1944 with Ninth Air Force light bombardment groups. Glass-nosed C-models often led formations; when the bombardier dropped, trailing B-models released on his cue. The type also served in the Pacific. In 1948 the Air Force redesignated it B-26—creating lasting confusion with the retired Martin Marauder. Recalled for Korea, Invaders flew night interdiction. In the 1960s rebuilt B-26K Counter Invaders returned to combat in Southeast Asia. It remains the only U.S. bomber to fight in World War II, Korea, and Vietnam.

(CONTINUED NEXT PAGE)

Douglas A-26C Invader

The Last Attack Bomber

(CONTINUED FROM PREVIOUS PAGE)

About Our Artifact

The Douglas Aircraft Factory plant in Tulsa, Oklahoma, manufactured this A-26 and delivered it to the US Army Air Force in the spring of 1945. Following World War II, this aircraft was loaned to France, which deployed it in Indochina against Viet Minh fighters. It was returned to the USAF in September 1954. At some point during its military career, it was converted from a C-model to a B-model.

Lynch Flying Service of Montana acquired the aircraft from the USAF and converted it into a water bomber for forest fire suppression. Evergreen Ventures purchased the aircraft in 1989, and Museum volunteers spent more than 6,000 hours restoring it to its wartime configuration. The nose art featuring *Margie* was inspired by the paint on a Martin B-26C assigned to the 552nd Squadron. ➤



North American P-51D Mustang

Escort fighter that carried the Eighth Air Force to Berlin



BILL KOLB

MONDAY DOCENT

Summary

The North American P-51 Mustang is the airplane that solved the Eighth Air Force's most urgent problem: how to take heavy bombers to Germany and bring the crews back. Designed in 1940 for Britain, transformed by the Packard-built Merlin, and refined in the bubble-canopy D model, it combined range, altitude performance, and six .50-caliber guns in a clean airframe. More than 15,000 Mustangs were built. The type escorted B-17s and B-24s over Europe, fought in the Pacific and Korea, and remains one of the most recognized fighters in the museum's collection.

Design, Production & Combat

In April 1940 the British Purchasing Commission asked North American Aviation to build Curtiss P-40s under license. President James H. "Dutch" Kindelberger instead offered a new fighter in 120 days. The NA-73X flew on 26 October 1940. Early Allison-powered Mustangs were fast and long-legged at low altitude but faded above 15,000 feet, where the air war was being decided.

The cure was the Rolls-Royce Merlin, license-built by Packard as the V-1650. Two-stage supercharging kept power at bomber altitude. The P-51B and P-51C that followed could fly to Berlin. The definitive P-51D, which reached squadrons in 1944, cut down the rear fuselage for a teardrop canopy, added a dorsal fillet for directional stability, and carried six Browning M2 machine guns instead of four. A typical D was 32 ft 3 in long, spanned 37 ft, and weighed about 12,100 lb at maximum takeoff. With a V-1650-7 rated at roughly 1,490 hp, it could reach about 437 mph at 25,000 ft, climb above 41,000 ft, and, with drop tanks, cover on the order of 1,650 miles.

North American built D-models at Inglewood, California (P-51D-NA) and Dallas, Texas (P-51D-NT); Dallas also produced the P-51K with an Aeroproducts propeller. About 8,000 D-models left the lines. In Eighth and Ninth Air Force service the Mustang cut bomber losses and forced the Luftwaffe to fight over its own airfields. The type also flew with the Fifteenth Air Force from Italy, with the RAF and Commonwealth, and in the Pacific. Redesignated F-51, it served in Korea as a fighter-bomber. The last Air National Guard Mustangs left U.S. service in 1957. ➤

The Consolidated PBY Catalina

WWII's Lifesaving Angel of the Seas



BILL KOLB

MONDAY DOCENT

Summary

The Consolidated PBY Catalina was one of the most important and adaptable aircraft of World War II. This long-range amphibious flying boat excelled in maritime patrol, anti-submarine warfare, and especially search-and-rescue missions across every theater. More than 4,000 Catalinas were built from 1936 to 1945. The PBY-5A variant added retractable landing gear for greater flexibility. Its rugged construction, exceptional endurance, and ability to land on water made it indispensable for rescuing downed aircrews and shipwreck survivors, including the crew of the famous USS Indianapolis.

The Consolidated PBY Catalina emerged in the mid-1930s as the U.S. Navy sought a modern long-range patrol flying boat to replace earlier types. Designed by Isaac M. Laddon at Consolidated Aircraft, the prototype XP3Y-1 first flew in 1935. The Navy quickly ordered production versions, and the aircraft entered service in 1936 as the PBY-1. Its parasol wing, large hull, and stabilizing floats gave it excellent seakeeping qualities while allowing impressive range and payload for the era.

The PBY's specifications made it a true workhorse for search and rescue. It featured a wingspan of 104 feet, a length of approximately 63 feet 10 inches, and was powered by two Pratt & Whitney R-1830 Twin Wasp radial

(CONTINUED NEXT PAGE)

The Consolidated PBY Catalina WWII's Lifesaving Angel of the Seas

(CONTINUED FROM PREVIOUS PAGE)

engines producing around 1,200 horsepower each. Typical crew numbered seven to nine, including pilots, navigator, radioman, flight engineer, and gunners. Maximum range reached about 2,520 miles, with a service ceiling near 15,800–18,100 feet depending on variant. The aircraft could carry life rafts, survival gear, and medical supplies in addition to its defensive armament.

During World War II the Catalina served with the U.S. Navy, Army Air Forces (as the OA-10), Coast Guard, and numerous Allied nations. It performed long-range reconnaissance, located enemy fleets, hunted submarines, and conducted dramatic rescues of downed aircrews and shipwreck survivors. In the Pacific, specially modified “Black Cat” PBYs flew nocturnal missions while also standing ready for rescue. The type's ability to land on water in open ocean gave it unmatched operational flexibility in remote areas.

One of the most famous SAR missions involved the USS Indianapolis. After the cruiser was torpedoed in July 1945, survivors drifted for days in shark-infested waters. A PBY Catalina crew spotted the men and landed in heavy seas to begin the rescue, radioing for additional help. The Catalina's crew pulled as many survivors as possible aboard while coordinating with other aircraft and ships. This effort, along with countless other open-ocean rescues, highlighted the PBY's critical role in saving lives.

The PBY-5A, introduced in 1941, became the most numerous and versatile variant by adding retractable tricycle landing gear. This allowed operations from conventional runways while retaining full water capability. Later models incorporated improved radar and enhanced defensive armament. Production continued through 1945, with additional aircraft built in Canada (as the Canso) and under license in other countries. Total output exceeded 4,000 airframes across all variants.

After the war, many Catalinas continued to serve with the U.S. Coast Guard in air-sea rescue until the mid-1950s. Civilian operators converted surplus aircraft into luxurious flying yachts or rugged firefighting water bombers. The type's long endurance, large cabin, and ability to operate from unprepared locations proved ideal for these roles. Today, a healthy number of Catalinas remain airworthy or are meticulously preserved in museums around the world, serving as tangible links to the Greatest Generation's aviation heritage.

The Consolidated PBY Catalina's combination of range, versatility, and ruggedness made it one of the truly indispensable aircraft of the Second World War. From spotting enemy fleets to plucking survivors from shark-infested waters in missions like the USS Indianapolis rescue, it earned a legendary reputation as a lifesaver. Its postwar civilian career and continued presence in museums ensure that new generations can appreciate this remarkable flying boat.

About Our Artifact

Our aircraft is a Canadian-built version of the Consolidated PBY Catalina, known as the Vickers Canso. This aircraft was delivered to the RCAF on June 2, 1943, and served with the Eastern Air Command, No. 13 P Squadron at Rockcliffe, and RCAF Sea Island between 1945 to 1951. After being leased to a French Civil Protection force in the 1960s, Nanaimo Airport in Vancouver, Canada purchased the aircraft, intending to modify it for tourist work in Malaysia. The conversion was never completed, and the aircraft was eventually flown to McMinnville in August 2011. ➤



North American AT-6C Texan



The Last Step Before a Fighter

BILL KOLB

MONDAY DOCENT

Summary

The North American AT-6 Texan was the advanced trainer that turned a student into a combat pilot. The Army Air Forces called it the Texan, the Navy the SNJ, and the British and Canadians the Harvard. A 600-horsepower Pratt & Whitney radial, tandem seats, and fighter-like handling made it the last airplane most Allied pilots flew before a P-51, a Hellcat, or a bomber. More than 15,000 were built. The museum's airframe is an SNJ-4, the Navy form of the AT-6C.

Design and Production

The line began with North American's NA-16 of 1935, an open-cockpit trainer that won an Army competition and became the BT-9. The BC-1 added a longer fuselage and a more powerful engine. From that airframe came the AT-6, ordered in 1939 as the Army's advanced trainer. Production ran at Inglewood and, in great numbers, at Dallas, which gave the airplane its name.

The wartime Texan was a low-wing monoplane with a Pratt & Whitney R-1340 Wasp of 600 horsepower, a fixed landing gear on most models, and two cockpits in tandem under a long greenhouse canopy. The instructor sat behind the student. It was deliberately demanding. The radial engine swung a heavy propeller, the airplane stalled sharply if mishandled, and on the ground it would swap ends if the pilot got careless with the brakes. A .30-caliber gun and a small bomb load on some models let gunnery and bombing schools use the same airframe. Top speed was about 200 mph. That was enough to teach a pilot energy, formation, and instrument flying without the cost of a fighter.

The AT-6A and AT-6B refined the engine and armament. The AT-6C saved aluminum by using plywood in the tail. The AT-6D, the most numerous, added a 24-volt electrical system. The Navy's SNJ-3, SNJ-4, and SNJ-5 were the same

(CONTINUED NEXT PAGE)

North American AT-6C Texan

The Last Step Before a Fighter

(CONTINUED FROM PREVIOUS PAGE)

airplanes with a tailhook and naval radios. Britain and the Commonwealth flew the Harvard. After 1948 the survivors were simply T-6s. Between 1949 and 1953 more than 2,000 were rebuilt as T-6Gs, with a cleaner canopy, more fuel, and a steerable tailwheel. In Korea, LT-6G Mosquitos flew forward air control.

No other Allied trainer put so many pilots into combat cockpits. A student who could fly a Texan could be trusted with a fighter. That was the point of the airplane.

About Our Artifact

This SNJ-4 was one of 2,401 built by North American in Dallas, Texas. Assigned S/N 88-13466 and Navy B/N 27780, it made a wartime career of training Navy pilots. Accepted into the Navy on May 11, 1943, the trainer served until it was stricken from the inventory in 1956 after completing 5,182.3 hours of flight time.

Upon its retirement, this airplane was sold to Ace Smelting Company on December 27, 1956, and it appeared its days were numbered. Five months later though, the plane was saved when it was sold to a private individual. Throughout the 1960s and early 1970s, the plane operated on the East Coast, mostly near New York.

During the mid-1960s, the airframe was reportedly altered for “weather modification” flights. These were performed to clear foggy runways at airports and were achieved by dropping dry ice pellets that froze the water droplets that formed the fog, making them heavy enough to fall to the ground. Sold again and restored to its original configuration, the SNJ-4 passed through numerous owners before coming to Evergreen in March 1986. ✈



GERMAN

JAPAN

FLIGHT PLAN

— AXIS SECTION —



The Focke-Wulf Fw 190



The Butcher Bird That Matched the Spitfire

BILL KOLB

MONDAY DOCENT

Summary

Kurt Tank's Fw 190 was the Luftwaffe's radial-engined counterpart to the Bf 109. Fast, heavily armed, and easy to fly at low and medium altitude, it shocked RAF pilots in 1941. More than 20,000 of all variants were built. The airplane in our museum is an A-7 configuration reproduction, displayed without an engine, not a wartime combat airframe.

Design and Production

Focke-Wulf began the Fw 190 in 1938 as a second fighter beside the Messerschmitt Bf 109. Tank chose an air-cooled BMW 801 two-row radial, wrapped in a tight cowling with a cooling fan behind the spinner. The first prototype flew on 1 June 1939. Early BMW 139 engines gave way to the 801, and a slightly larger wing cured high-speed handling problems.

The A-series was the main fighter line. Wide-track landing gear made it safer on rough fields than the 109. A bubble-style canopy gave good view. Armament grew from light machine guns to a typical A-8 load of two 13 mm MG 131s over the engine and four 20 mm MG 151 cannon in the wings—enough to break up a bomber box. MW 50 boost pushed short-period power near 2,000 horsepower. Top speed of a clean A-8 was about 408 mph. When the type reached the Channel front in 1941 it outclassed the Spitfire V below 20,000 feet. The RAF did not

(CONTINUED NEXT PAGE)

The Focke-Wulf Fw 190

The Butcher Bird That Matched the Spitfire

(CONTINUED FROM PREVIOUS PAGE)

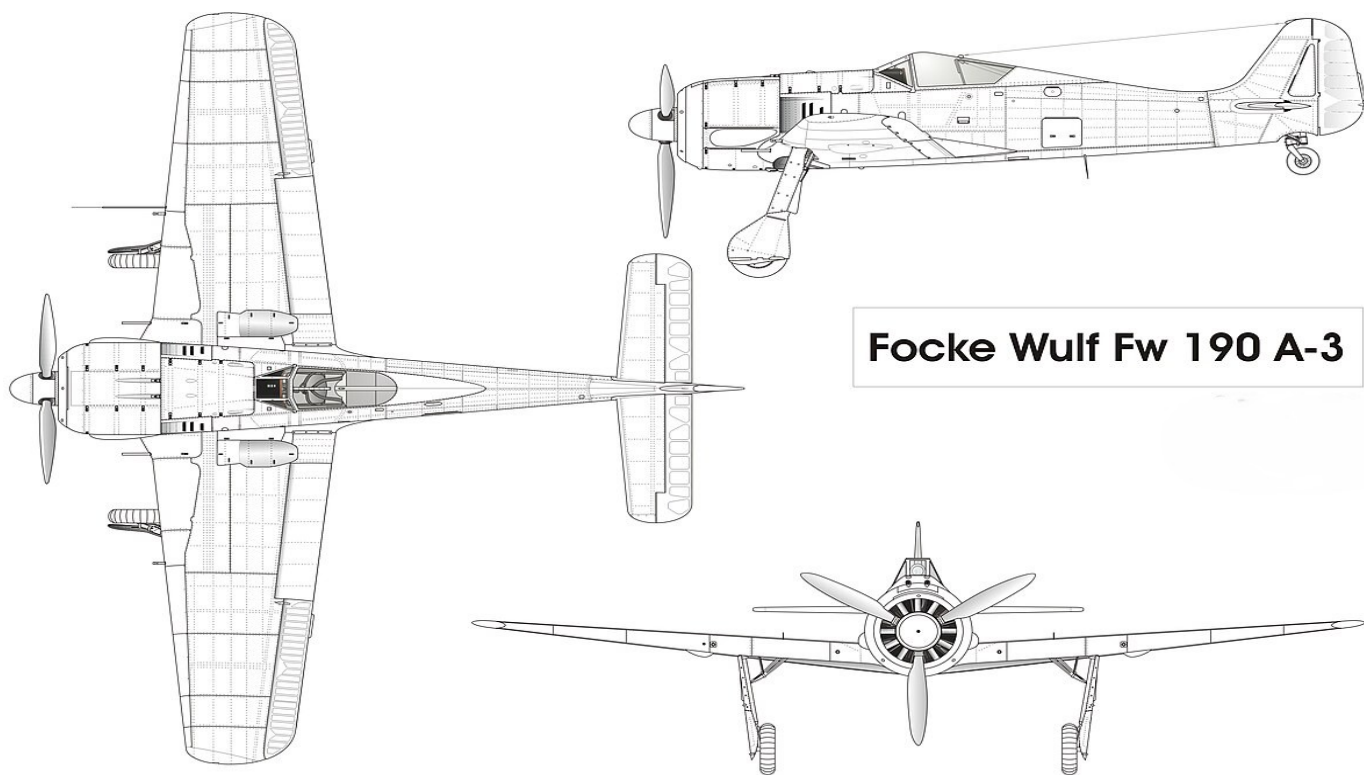
regain parity until the Spitfire IX and the captured example that landed in Wales in 1942. Fw 190s then fought everywhere the Luftwaffe fought: the Eastern Front, the Mediterranean, Defense of the Reich, and as F- and G-model fighter-bombers. The long-nose D-9 “Dora,” with a Junkers Jumo 213 inline engine, was a different airplane built to meet high-altitude Mustangs and Lightnings.

Factories at Marienburg, Cottbus, Oschersleben, and elsewhere, plus license lines, delivered on the order of 20,000 Fw 190s of all marks—about two-thirds fighters and night fighters, the rest attack and bomber variants. The A-8 was the most numerous A-model. Production continued into 1945; a handful of French-assembled NC.900s appeared after the German collapse.

About Our Artifact

The Fw 190 on the museum floor is a reproduction finished as an A-7, the late-1943 mark that introduced the heavier cowling guns later standardized on the A-8. Photographs and visitor notes correctly call it a replica. It is displayed without an engine. A Werknummer in the old RLM style was assigned to the reproduction for identification; it is not the serial of a recovered combat aircraft.

That honesty matters. Original Fw 190s are rare. Roughly two dozen genuine airframes survive worldwide, and only a few still fly with original BMW 801s. What this exhibit can do is show the compact shape, the wide gear, and the gun layout that made Allied pilots call the type the Butcher Bird—Würger. Pair it with the museum’s Bf 109 and the contrast Tank intended in 1938 is still visible: two German answers to the same war, one inline, one radial. ➤



Focke Wulf Fw 190 A-3

Messerschmitt Me 262 A-1A Schwalbe

The jet that made Mustangs feel parked



BILL KOLB

MONDAY DOCENT

Summary

The Me 262 was the first operational jet fighter. Twin Junkers Jumo 004 engines pushed it past 540 mph, faster than any Allied piston fighter. It entered combat too late and in too few numbers to change the war.

Design and Production

Willy Messerschmitt's team began jet studies before the war, first as Projekt 1065. The airframe was built around two axial-flow turbojets and a slightly swept wing of about 18.5 degrees, chosen as much for balance and thickness as for compressibility. Early taxi tests used a Junkers Jumo 210 piston engine in the nose because the jets were not ready. The Me 262 V3 made the first pure-jet flight on July 18, 1942, at Leipheim with Flugkapitän Fritz Wendel.

The production fighter was unlike anything in a 1944 hangar. Two Junkers Jumo 004B-1 engines hung in underwing nacelles, each producing about 1,980 pounds of thrust. The 004 featured an 8-stage axial compressor and a single-stage turbine, ran hot, burned a mixture of J-2/diesel-type fuel, and had a service life often measured in tens of hours. A tail-heavy, empty airplane forced a change from tailwheel to tricycle gear so the jets would not toast the runway on takeoff. The wing used automatic leading-edge slats and a mild sweep that kept the airplane controllable as it approached compressibility. Dive limits were real; pilots were warned not to chase the Me 262 past about 0.86 Mach.

The A-1a Schwalbe carried four 30 mm MK 108 cannons in the nose, clustered so their trajectories converged at bomber range. The MK 108's low muzzle velocity limited the effective burst, but one or two hits could destroy a

(CONTINUED NEXT PAGE)

Messerschmitt Me 262 A-1A Schwalbe

The jet that made Mustangs feel parked

(CONTINUED FROM PREVIOUS PAGE)

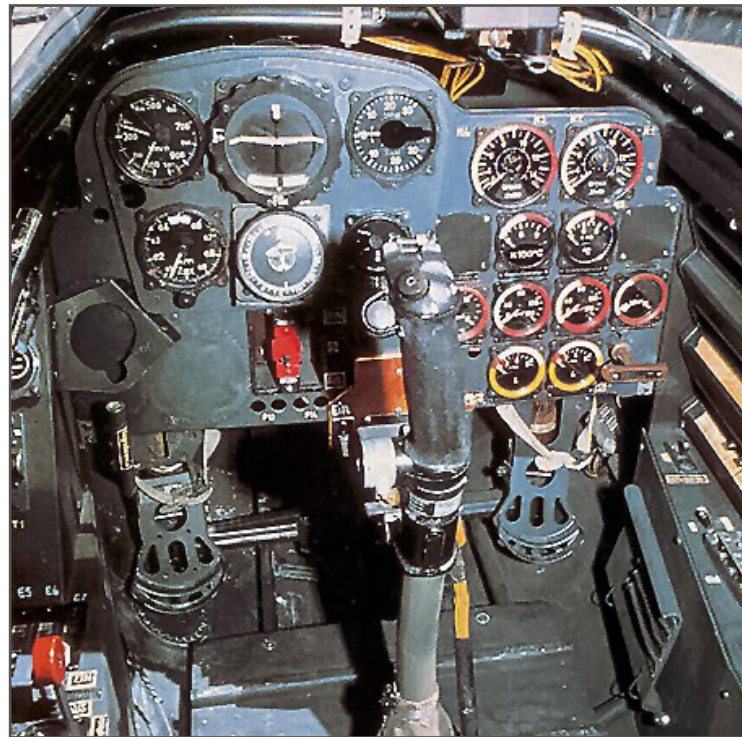
B-17. Revi 16B (later EZ 42) sights, the FuG 16ZY radio, and IFF completed the fighter fit. The A-2a Sturmvolgel added bomb racks under the nose. The two-seat B-1a trained conversion pilots; some B-1a/U1 night fighters carried Lichtenstein radar in a “stag antler” array. Planned R4M air-to-air rockets arrived late and in small numbers.

Cockpit and systems were a mix of advanced and crude. The pilot sat high under a heavily framed canopy. There was no thrust reverser and almost no margin for a balked landing. Jet-pipe temperature and rpm had to be nursed; a slammed throttle could flame out an engine or cook a turbine. Takeoff runs were long. Once clean and at altitude, the Me 262 left Mustangs and Tempests behind in a straight line and could boom-and-zoom through a bomber box that piston fighters reached only by climbing for minutes.

Hitler’s insistence on a bomber version, engine shortages, bombing of Regensburg and Leipheim, and the collapse of the fuel system kept the force small. About 1,430 airframes were completed. A fraction reached JG 7, KG 51, Kommando Nowotny, and a handful of other units that flew them from late 1944 until May 1945. They still destroyed hundreds of Allied aircraft. After the war, captured jets went to Wright Field, Farnborough, and the Soviet Union, setting the pattern for every early Allied jet.

Psychological Impact

The first sight of an Me 262 did not feel like meeting another fighter. It felt like the rules of the fight had been withdrawn. Allied crews had been briefed on silhouettes and speeds; that preparation survived about as long as the closing pass. A P-51 pilot’s first thought was often that he was standing still. A bomber gunner’s was that no turret could swing fast enough. The jet had no propeller to read, made a sound the ear did not yet own, and was gone in the time a man used to settle his sight. What followed was a brief, private collapse of confidence: months of hard-won mastery in a Mustang, Thunderbolt, or Fortress suddenly looked antique. Navigators wrote of wonderment and disbelief; waist gunners admitted they were scared; POWs who saw one scream over Stalag Luft III wondered whether the war they thought was ending might still be lost. The fear was not mystical. It was the shock of being outrun by a machine that made deflection shooting, pursuit curves, and even recognition feel obsolete in a single pass. Tactics caught up, but the first encounter left a mark that briefings never did: the sense that the air war had jumped a generation while they were still in it.



About Our Artifact

Legend flyers in Everett, Washington, reconstructed this original aircraft using the same materials and construction techniques as the original Me 262. The paint scheme is modeled after the aircraft flown by Oberleutnant Alfred Ambs. Ambs served with III./JG 7 from December 1944 to March 1945, flew about 70 missions, and gained 8 confirmed victories. He and his Schwalbe were shot down by Tuskegee Airman 1st Lieutenant Earl R. “Squirrel” Lane on March 24, 1945. ➤



The Forecast That Launched Overlord

Monday was a gale. Tuesday was a gamble.

BILL KOLB

MONDAY DOCENT

Summary

D-Day was a weather decision before it was a beach decision. Eisenhower needed a full moon, a low tide at daybreak to expose the mined obstacles, winds the landing craft could live with, and a ceiling high enough for airborne troops and the air forces that were the invasion's shield. June 5, 6, and 7 were the only dates that stacked those requirements before mid-month. Two schools of Allied meteorology argued over those dates. One read the sky by historical analogy. The other read it by the physics of the systems then on the Atlantic chart. Group Captain James M. Stagg had to turn that argument into a single sentence Eisenhower could act on.

What the Operation Required

Operation Overlord could not sail into a gale or wait forever. The next usable tide-and-moon window after June 7 sat two weeks later. Convoys were already at sea. Once postponed, the secret would rot, and the weather might be worse. On the far shore, German meteorologists watched the same storm track with fewer Atlantic observations and concluded that no landing was possible until the weather broke in mid-June. Field Marshal Rommel left for Germany. The Allied argument, then, was not academic. One camp said go on the 5th. The other said the 5th would drown the assault.

Two Ideas of Tomorrow

Three forecast centers fed Stagg. Widewing, the American team under Irving P. Krick and Ben Holtzman, worked by analogy. They searched the historical record for surface maps that resembled the map on the table, then assumed the future would rhyme with those past cases. In early June, they saw the Azores High nudging north and a pattern that, in the files, had often quieted the Channel. By that method, June 5 looked usable. Krick was confident he could see farther ahead than the British would claim.

Dunstable, the Met Office team, C. K. M. Douglas, and the Norwegian Sverre Petterssen worked the other way. They followed the life of the systems themselves: a depression off the Atlantic, a thermal gradient sliding

(CONTINUED NEXT PAGE)

The Forecast That Launched Overlord

Monday was a gale. Tuesday was a gamble.

(CONTINUED FROM PREVIOUS PAGE)

toward Scotland, and an anticyclone over Greenland shoving cold air south. Their charts said a large low would drive rain, low cloud, and strong winds across the invasion beaches on the 5th. The Admiralty team sat closer to that reading than to Krick's. Stagg, a Scot who had learned how quickly British weather changes its mind, had to choose. He sided with Dunstable. At Southwick House, in the small hours of June 4, he gave Eisenhower what Ike later called "the worst report you ever saw": ten-tenths cloud, bases down toward 500 feet, winds 13 to 30 mph with higher gusts, squalls, and coastal fog. Convoys already at sea were turned around. June 5 arrived exactly as the dynamists had drawn it.

The Narrow Ridge

Then the analog team and the dynamists had to argue the next day. A late observation from an Atlantic weather ship and charts drawn on the 4th showed a brief ridge of high pressure building behind the departing low. It would not last. It would not be pretty. Stagg told Eisenhower on the evening of June 4, with rain still hitting the windows, that Tuesday the 6th should bring broken cloud, a base near 2,000 feet, winds around 15 to 18 mph, marginal, not ideal, but enough. Widewing still preferred its earlier optimism; Dunstable remained the more cautious voice. The weight had shifted. Eisenhower asked his commanders in turn and said go.

June 6 was as advertised: choppy, seasick, cloud lower than the air plan wanted in places, the tide running faster than hoped. It was also better than the 5th, which would have grounded the airborne drop and the bombers and swamped the LCTs. Across the Channel, the German forecast had not seen the ridge. Luftwaffe meteorologists told Army Group B the weather would remain unfit into the second week of June. That was the other competition that mattered. The Allies had weather ships, flights, Irish observations, and more of the Atlantic on the map. They argued themselves into a thirty-six-hour window. The other side never put the window on its chart.

A Post Script

From June 19 to June 22, 1944, a northeaster hit the Normandy coast, the worst summer gale there in about forty years. Winds ran 25 to 32 knots. The Mulberries had been built for ordinary summer weather, and this one arrived before the American port was fully anchored.

Mulberry A, off Omaha at Saint-Laurent-sur-Mer, was destroyed. The outer floating breakwaters, the Bombardons, tore loose and battered the concrete Phoenix caissons and the Whale roadways. Barges and landing craft inside the harbor finished the work. Of 28 Phoenix caissons, 21 were wrecked, and all 24 Bombardons went adrift. By June 22 the harbor was written off and never rebuilt. Usable pieces went to the British port.

Mulberry B, off Arromanches at Gold Beach, lay in the lee of a reef. It was damaged but usable, and became Port Winston. Designed for about three months, it stayed in heavy use for eight, unloading on the order of 6,000 tons a day.

The Americans went back to the open beaches and, after the storm, landed about 15,000 tons a day at Omaha and 8,000 at Utah, more than the surviving Mulberry. Eisenhower took the loss as a warning that the artificial ports would not survive winter, which added urgency to the capture of Cherbourg.

After the Noreaster, Eisenhower wrote Stagg: "*Thanks, and thank the gods of war we went when we did.*" ➤

Tinian Island

The Runways That Ended the Pacific War

SCOT LANEY

BILL KOLB

CEO

MONDAY DOCENT

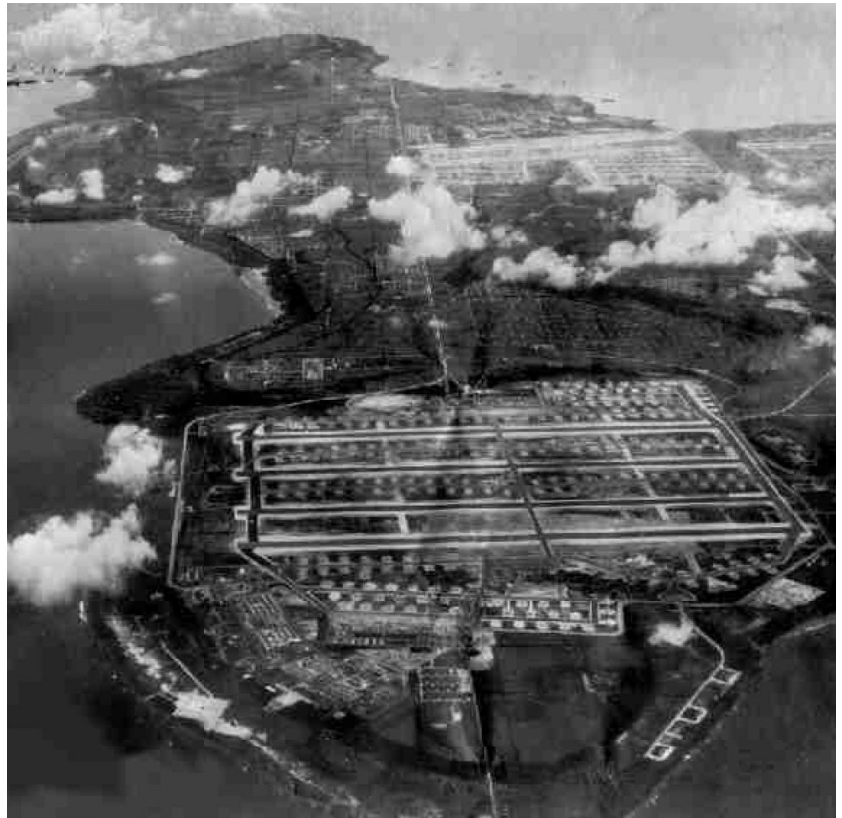
Summary

Tinian is a small coral island in the Marianas, three and a half miles south of Saipan. In the summer of 1944 it was the third objective of Operation Forager. Marines of the 2nd and 4th Divisions landed on 24 July and the island was declared secure on 1 August. What followed was as important as the fight. Navy Seabees turned Japanese Ushi Point Field and the southern strips into North Field and West Field—six runways of about 8,500 feet, hardstands for hundreds of B-29 Superfortresses, and a base that for a time was the largest airfield complex in the world. From those coral strips the 313th and 58th Bombardment Wings flew the conventional and incendiary campaign against Japan. In May 1945 the 509th Composite Group took a fenced corner of North Field. On 6 August the B-29 Enola Gay left Runway Able for Hiroshima; on 9 August Bockscar left for Nagasaki. The museum has received a runway light from that airfield world. Until catalog data are complete, this paper tells the island's story and holds a place for the object.

The Island and the Landing

Tinian is low, relatively flat, and shaped enough like Manhattan that Seabees later named its roads Broadway and Eighth Avenue. Japan had developed Ushi Point Airfield at the north end and other strips farther south. After Saipan fell in July 1944, Tinian was the next step. Holland M. Smith later called the landing “the perfect amphibious operation in the Pacific War.”

The plan used deception. The 2nd Marine Division demonstrated off Tinian Town in the southwest while the 4th Marine Division went ashore on the narrow White Beaches at the northwest corner on 24 July 1944. Seabees fitted some LVTs with improvised ramps—“doodlebugs”—to climb the low coral ledge. A heavy Japanese counterattack that night failed and cost the garrison much of its best infantry. Mount Lasso and Ushi Point Field were taken within days. Japanese remnants made a last stand on the southern limestone plateau. The island was declared secure on 1 August; mopping up continued. American losses were far lower than on Saipan. The Japanese garrison was virtually destroyed. Civilian tragedy followed on the cliffs, as it had on Saipan.



(CONTINUED NEXT PAGE)

Tinian Island

The Runways That Ended the Pacific War

(CONTINUED FROM PREVIOUS PAGE)

The Miracle of Construction

Seabees of the Sixth Naval Construction Brigade went to work while fighting still flickered. They repaired the Japanese strip at Ushi Point, then built what became North Field: four parallel east–west runways lettered Able, Baker, Charlie, and Dog from north to south, each on the order of 8,000 to 8,500 feet, with some eleven miles of taxiway and hardstands for about 265 B-29s. A few miles south, West Field added two more long runways for a second wing. Combined, Tinian's six strips and their ramps made the largest air base of the war.

The material was the island itself. Crews blasted and crushed coral, hauled fill by the hundreds of thousands of truck-miles, and built the ends of the northern runways out to fifty-foot coral cliffs where the land fell away. Official and unit histories speak of on the order of a million cubic yards moved for the first northern strips and far more for the whole island project. Camps, shops, a harbor at San Jose, and a street grid named for New York filled the rest. At peak some 40,000 people lived and worked on Tinian. North Field was ready for heavy operations in early 1945; the fourth northern runway was finished in May.

B-29 Base: 313th and 58th Wings

Twentieth Air Force's XXI Bomber Command used the Marianas as the long-awaited staging area that China and India could not provide. The 313th Bombardment Wing, Brig. Gen. John H. Davies, took North Field from late December 1944. Its groups were the 6th (Circle R), 9th (Circle X), 504th (Circle E), and 505th (Circle W), later joined by the 5th Photographic Reconnaissance Squadron and the 509th. Groups were parked by runway: the 505th on the north side of Able, the 504th between Baker and Charlie, the 9th between Charlie and Dog, the 6th south of Dog.

West Field received the 58th Bombardment Wing in the spring of 1945 after that wing left the China–Burma–



India shuttle: the 40th, 444th, 462nd, and 468th Groups. From Tinian, Saipan, and Guam the B-29 force flew high-altitude daylight attacks, then, under Maj. Gen. Curtis LeMay, low-level night incendiary raids, including the 9–10 March 1945 attack on Tokyo. The 313th also flew Operation Starvation, the aerial mining of Japanese home waters. Unit accounts credit Tinian-based aircraft with tens of thousands of sorties and a huge share of the tonnage dropped on Japan in 1945. A typical strike was a long overwater flight of many hours. Night takeoffs and recoveries on coral runways made lighting and marking as much a part of the base as the bombers themselves.

Tinian Island

The Runways That Ended the Pacific War

(CONTINUED FROM PREVIOUS PAGE)

The 509th and the Missions of August 6th & 8th, 1945

In late April and May 1945 the 509th Composite Group, Col. Paul W. Tibbets, Jr., moved from Wendover, Utah, to a separate camp and apron near North Field. The group's Silverplate B-29s were modified for special stores. Most of the men on Tinian did not know the cargo. Project Alberta personnel from Los Alamos assembled the weapons on the island. Loading pits let a bomber roll over a weapon too large to hoist into a closed bomb bay in the ordinary way. USS Indianapolis delivered components of Little Boy to Tinian in late July.

At about 0245 on 6 August 1945, Enola Gay took off from Runway Able for Hiroshima with the uranium weapon Little Boy. Three days later Bockscar, Maj. Charles W. Sweeney, took off from Tinian with the plutonium weapon Fat Man. Kokura was the primary target; weather sent the aircraft to Nagasaki. Japan announced surrender on 15 August. Those two flights are why Tinian is known far beyond the Marianas. They were the last act of a year of construction and of a conventional bombing campaign already under way from the same strips.

About Our Artifact

Silent Witness to History: Crouse-Hinds Runway Marker Light

This rugged airport boundary light once lined the coral-paved runways of North Field on the remote Pacific island of Tinian. Built by U.S. Navy Seabees in 1944–1945, North Field quickly grew into the largest, busiest aerodrome in the world, featuring four massive 8,500-foot runways designed to support hundreds of Boeing B-29 Superfortresses conducting strategic bombing operations against mainland Japan.

In late July 1945, the heavy cruiser USS Indianapolis (CA-35) steamed into Tinian on a top-secret, record-breaking dash across the Pacific. She delivered the enriched uranium core and crucial trigger components for “Little Boy,” the world's first operational atomic weapon. Just days after completing this covert delivery, the Indianapolis was torpedoed and sunk by a Japanese submarine in the Philippine Sea, resulting in the catastrophic loss of nearly 900 sailors and Marines—the greatest single-ship loss of life in U.S. naval history.

In the early morning hours of August 6, 1945, this boundary marker—and dozens like it—cast an amber glow across Runway A as a modified B-29 dubbed the Enola Gay taxied into position. Piloted by Colonel Paul W. Tibbets Jr. and carrying the assembled atomic bomb, the heavily laden bomber roared down the runway toward the open ocean, bound for Hiroshima. The mission, followed days later by the flight of Bockscar to Nagasaki, ushered humanity into the Atomic Age and brought World War II to a swift, fateful conclusion.

Cast in durable aluminum and glass by the Syracuse-based Crouse-Hinds Company, fixtures like this withstood the harsh equatorial sun and salt air. Today, this artifact stands as a silent sentinel to the technological mobilization of wartime industry, the tragic sacrifice of the USS Indianapolis, and the dawn of nuclear warfare.

Recovered from the North Field at Tinian in 1963. Donated to the Museum in 2026. ➤



October's Mystery Corner

ALDEN SKINNER

ARCHIVIST EXTRAORDINAIRE

What the heck is this?



A model of a satellite, that's all we know. Answer (hopefully) to be revealed in the November edition.

Readers are encouraged to provide Archives with their best answer/guess by responding to Jean Herkamp at: jean.herkamp@evergreenmuseum.org.

September's Mystery Corner

ALDEN SKINNER

ARCHIVIST EXTRAORDINAIRE

LAST MONTH'S MYSTERY:
What the heck is this?



Answer:

This is a magneto timing disc for the Goose.

Band of Brothers



The McMinnville, Oregon Band of Brothers meets on the **first Thursday of each month**. Because of changes, we are not sure of the location at the Museum. The **meetings start at 11:30 am** and run about an hour, with coffee and cookies served. More details can be found at the group's **Facebook page**: <https://www.facebook.com/groups/838928846550343>

We are currently looking for speakers. If you would like to become one of the monthly speakers, please contact **Al Arguedas** at aja@onlinemac.com.

MONTHLY THEMES

NOVEMBER.....AVIATION: POST-WWII
THROUGH KOREA

DECEMBER SPACE FLIGHT: APOLLO

SEPTEMBER FLIGHTPLAN NEWSLETTER CONTRIBUTORS

EDITOR: BILL KOLB BILL@KOLBVINEYARDS.COM

FEATURE WRITER: BILL KOLB

LAYOUT: BILL KOLB

EMAIL SUBMISSIONS TO: FLIGHTPLAN@EVERGREENMUSEUM.ORG

.....