

The Evolution of the U.S. National Air Insignia: 1861–Present

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Introduction

The dream of flight is as old as civilization itself. Sumeria and Egypt had mythologies replete with flying gods. The Old Testament is filled with verses that some have interpreted as non-technical descriptions of ancient aircraft. Greek mythology tells of Daedalus and his son Icarus who fashioned wings of wood, wax, and feathers. And the Judeo-Christian culture conceived of angels as semi-divine humans with wings of birds. On the practical side, the Chinese invented the rocket centuries ago. Those early rockets could not carry a man—or, for that matter, an effective warhead—their main use was in frightening an enemy. The concept of human flight originated with Leonardo da Vinci. Not only a great artist, he was a skilled engineer with a great imagination who designed weapons of war, a pair of man-powered wings, and the first crude helicopter.

On 15 October 1783 the brothers Montgolfier sent Jean François Pilatre de Rozier aloft in a balloon. As the first human to break the bonds of Earth, he became the world's first aeronaut. Ballooning itself was known as *aerostation*.¹ That first manned balloon (or *aerostat*) carried the first national air markings (Plate 1). Contemporary paintings, drawings, and models depicted the balloon in blue and gold, the colors of the French royal arms. The balloon was not only emblazoned with several *fleurs-de-lis*, but it also bore at least four sun badges, the emblem of Louis XIV. Nearly continual experimentation in bal-

¹ Donald Dale Jackson, *The Aeronauts* (Alexandria, Virginia: Time-Life Books, 1981), 16-20.

looning through the rest of the 18th century and into the early 20th century would involve balloons carrying national flags.

These early experiments in flight eventually led to the aircraft of today. Along the way, air forces found that their aircraft needed to be identified. Early on, cloth flags were found impractical and thus began the story of the emblem known as the “National Air Insignia” of United States military aircraft. For warriors of the air, the National Air Insignia serves the same function as flags and standards do for the infantry. And like other flags, it has a long and proud history, told here in complete form for the first time.

The Birth of Military Aviation

As always, mankind can turn any great invention into a weapon of war. Joseph Montgolfier soon persuaded the French to use his balloon for military observation. In April 1794, less than six months after the first flight, the French army organized the world’s first air force, the 25-man *Compagnie d’Aerostatiers* and built the first military aircraft *L’Entrepreneur* (The Enterprise). On 26 June 1794 *L’Entrepreneur* went into action. Not only did this *aerostat* provide valuable intelligence, it frightened the opposing Austrian forces as well.²

Over 50 years later, in June of 1849, the Austrian army experimented with aerial bombardment. Due to an unforeseen shift in the wind, the attempt proved a disaster.³

The American Civil War is often called the first modern war. In addition to its many technical and tactical innovations, it was the first war in which both sides used balloons for aerial observation. Before the Civil War, a number of aeronauts operated balloons in the U.S., but only a few seem to have considered the possibility of military aerial observation. It was Thaddeus S. C. Lowe who first approached President Abraham Lincoln with plans for the formation of a balloon corps operating to report the disposition of the enemy via telegraph. Lincoln, impressed, appointed Lowe chief of the new Aeronautical Division.

American military ballooning debuted at the First Battle of Bull Run on 21 May 1861. Although Federal forces had broken and began to retreat,

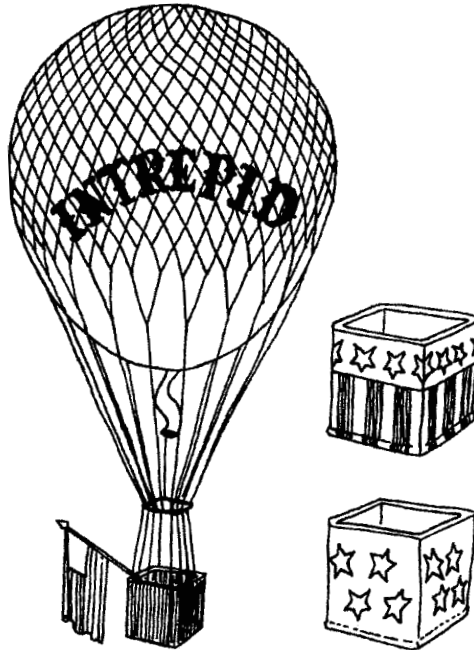
² *Ibid.*, 76-81.

³ Anabel Dean, *Up, Up, and Away: The Story of Ballooning* (Philadelphia: Westminster Press, 1980), 61.

Plate 1: Early Balloon Markings



Montgolfier balloon. Gas bag B with Au ornaments.



*Left: Typical Union balloon with flag attached to the gondola, 1861–1863.
Right: Typical painted gondolas.*

Lowe reported that the rebels were not in pursuit. Lowe, in his tethered balloon *Enterprise*, made history when he delivered the first aerial reports by electric telegraph.

At its greatest strength, the Aeronautical Division operated seven more balloons: the *Constitution*, *Eagle*, *Excelsior*, *Intrepid*, *Union*, *United States*, and *Washington*.⁴ The division also operated the world's first aircraft carriers. The first was the Union transport *Fanny*, which launched balloons on 31 July 1861. The other was the converted collier *G. W. Custis*. Although balloons operated successfully and provided valuable intelligence, the lack of support from higher echelons caused the eventual collapse of the Balloon Division in June of 1863. The balloons appear to have been gray with their gondolas painted in the colors of the Union flag or with the insignia of the American eagle: the first U.S. aircraft markings (Plate 1).⁵

On the opposing side, in spite of the very effective Union naval blockade the Confederate "Air Force" managed to launch at least three balloons. Two are supposed to have been made from the silk dresses donated by patriotic Southern Belles. There is no description of any markings used by the Confederate balloons.

Despite the obvious advantages of aerial observation, the U.S. Army had no balloons after the Civil War until Brigadier General Adolphus W. Greely established a balloon section in 1892. During the Spanish-American War, the entire balloon force (one balloon!) was moved down to Cuba and served with distinction until it was withdrawn due to battle damage. The balloon, the *Santiago*, does not appear to have a painted gondola, but may have been decorated with two American flags.⁶ In 1899 the Balloon Section was disbanded until August of 1908, when the U.S. Army's Signal Corps acquired another balloon. This time it was a self-propelled dirigible, *U.S. Military I*, an all-gray balloon devoid of markings, national or otherwise.

In the 1890s, many inventors were trying to build a workable heavier-than-air flying machine, and in 1903 the Wright Brothers achieved the first powered manned flights. Although the Wrights offered this achievement to the Army, it was wary of this new technology. Not until 1 August 1907 did the Signal Corps establish the Aeronautical Division, and received its first

⁴ Lennart Ege, *Balloons and Airships* (New York: MacMillan, 1974), English ed. Kenneth Munson, trans. Erik Hildesheim, ill. Otto Frello, 114.

⁵ Jackson, 83, 87.

⁶ Ege, 114.

aircraft in September of 1907—a Wright Military Flier. Designated *Aeroplane No. 1, Heavier-Than-Air Division, United States Aerial Fleet*, the aircraft was repeatedly flown, crashed, and rebuilt. On 4 May 1911 it was rebuilt and restored for the last time and placed in the collection of the Smithsonian Institution.⁷ It carried the Signal Corps badge on the tail (Plate 2), identifying the plane as property of the Signal Corps rather than serving as a national marking.⁸

The U.S. Navy lagged in employing this new technological wonder. But after 22 October 1910, when naval officers began inspections of aircraft, naval air technology accelerated. On 14 November 1910, Eugene Ely made the first flight from the deck of a warship. Then on 18 January 1911, Ely landed an aeroplane on the deck of a ship and took off less than an hour later.

While the Wrights were impressing the Army aviators, Glenn Curtiss invented “hydroaeroplanes” (which eventually came to be called “seaplanes” and “flying boats”). The first hydroaeroplane flight took place on 26 January 1911. Curtiss’s next innovation was retractable landing gear for his hydroaeroplane, which he called the “Triad” because it could operate on land, sea, or air.

Despite the Curtiss innovations, the Navy bought a Wright B-1 fitted with pontoons and wheels. The tails were marked with the initials “U.S.N.” in black. The aircraft themselves were covered with a white fabric and painted with a clear varnish known as airplane dope, which gave the aircraft a yellowish to buff color. Some aircraft were painted gray, with the “U.S.N.” marking in white (Plate 2).⁹ Marine Corps aviation began on 6 January 1914 with the assignment of two aircraft. The planes were marked like their Navy counterparts, but with the initials “U.S.M.C.” (Plate 2).¹⁰

Putting Aviation to the Test

In the Mexican Revolution, naval aviation became the nation’s first air arm to see operational duty. Overthrow after overthrow eventually found Mexico with a new president, Victoriano Huerta, in 1913. He presided over one of the cruelest regimes Mexico had ever seen. Because the constant state of revo-

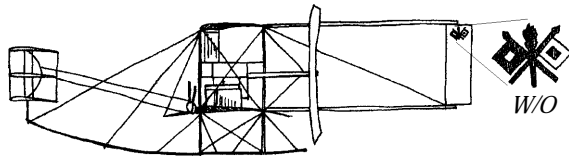
⁷ Alfred Goldberg, ed., *A History of the United States Air Force: 1907-1957* (Princeton, New Jersey: D. Van Nostrand, 1957), 2-6.

⁸ Claudia M. Oakes and Kathleen L. Brooks-Pazmany, *Aircraft of the National Air and Space Museum*, 3rd ed. (Washington, D.C.: Smithsonian Institution Press, 1985).

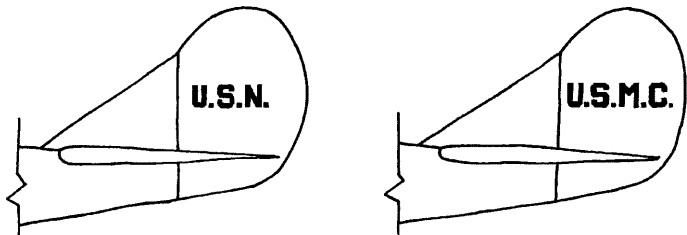
⁹ Rear Admiral George Van Duers, *Wings of the Fleet* (Annapolis, Maryland: U.S. Naval Institute Press, 1966), 51, 60.

¹⁰ *Ibid.*, 102.

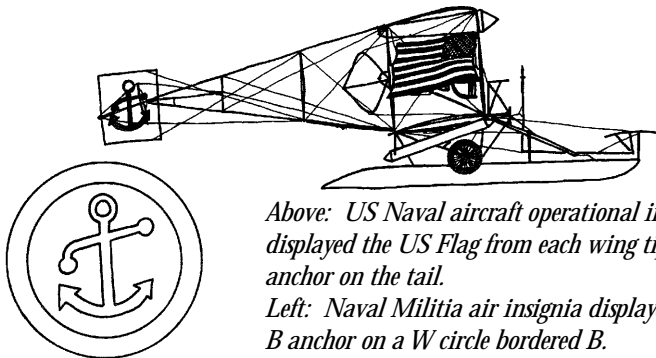
Plate 2: Early U.S. Aircraft Markings



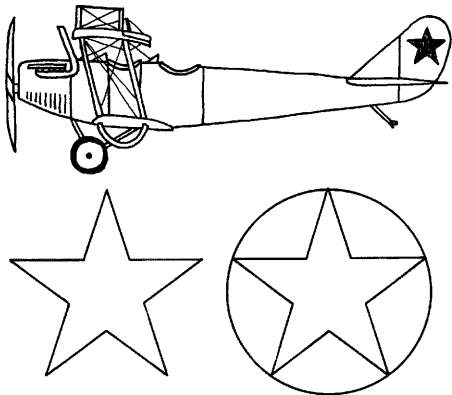
U.S. Army Signal Corps Aeronautical Division Wright Military Flier, 1907.



Early tail markings for U.S. Navy, 1911, and U.S. Marine Corps, 1914, airplanes.



*Above: US Naval aircraft operational in Mexico displayed the US Flag from each wing tip and a B anchor on the tail.
Left: Naval Militia air insignia displayed the same B anchor on a W circle bordered B.*



*Airplane and markings of the 1st Aero Squadron.
Left: R star; Right: variant, R star on W*

lution threatened American investments in Mexico, U.S. President Woodrow Wilson decided that the United States should intervene in Mexican affairs.

Wilson dispatched an American warship to the port city of Tampico and several Marines went ashore in a restricted area. They were promptly arrested but later released with an apology. This was not enough for the American commander, who demanded a 21-gun salute to the American flag. President Huerta flatly refused. President Wilson replied by sending the American fleet into the Gulf of Mexico to seize the port city of Vera Cruz. Along with the ships came the Navy's force of aeroplanes. The plan backfired. The U.S. hoped that the occupation would cause the Mexican people to overthrow Huerta, but instead they rallied behind their president. Mobs took over American-owned businesses in the capital. Huerta then threatened to invade Texas, arm American blacks, and raise the Mexican flag over Washington.¹¹

The performance of naval aviation was, at best, ineffectual. But because Mexico also had an aviation capability, the American aircraft needed identifying marks. No one had yet considered a national insignia for aircraft. Instead, a small American flag was placed at the ends of the wings.¹² The tail markings were also changed. Each aircraft was marked with a large blue anchor on the rudder, similar to the anchor emblazoned on naval battalion flags (Plate 2). The anchor insignia may also have been painted on the underside of the wings.¹³ After operations in Vera Cruz, photographs of naval aircraft seem to show that the use of flags and anchor insignia were soon discontinued and the "U.S.N." tail marking re-established.

The Navy soon took steps to establish an air arm for the Naval Militia—the predecessor of the Naval Reserve. Aircraft of the Naval Militia appear to have placed the anchor insignia inside a circle (Plate 2), similar to the distinguishing insignia of the Naval Militia—a blue anchor on a white diamond surrounded by a narrow blue border. This insignia appears to have been used until 1916 or 1917.¹⁴

¹¹ Henry Bamford Parkes, *A History of Mexico* (Boston: Houghton Mifflin, 1969), 342-346.

¹² Van Duers, 108, 110.

¹³ Peter M. Bowers. "The U.S. National Insignia", *Historical Associates* (n.d.). Photocopy of a magazine article from the "Insignia" file at the Office of History, San Antonio Air Logistics Center, Kelly AFB, Texas.

¹⁴ Henry Woodhouse, *Woodhouse's Textbook of Naval Aeronautics, 1917*, introduction by Clark G. Reynolds (Annapolis, Maryland: U.S. Naval Institute Press, 1991), 155-169.

The next test for military aviation also followed the Mexican Revolution. In 1916 rebel general Pancho Villa suffered a series of military defeats. Low on supplies, he took to raiding the border town of Columbus, New Mexico, which led to virtual warfare on the sparsely populated U.S.-Mexico border. The War Department, responding to public outrage over the continuing violations of American soil, sent Brigadier General John J. Pershing on a punitive expedition to capture Pancho Villa—dead or alive! Along with his army came the men and machines of the 1st Aero Squadron. The squadron had begun operations on 15 March 1915 with eight aircraft. Through a series of errors and circumstances that bordered on the comical, the 1st ended up with just two functional aircraft. The squadron later received new aircraft, but ceased to be an effective fighting force.

As in Vera Cruz, the 1st bore no official national markings, but adopted a distinctive insignia for its aircraft. The squadron painted red stars, either alone or on a white roundel (a colored disk), on the rudders of its JN-3 and R-4 aircraft (Plate 2), but this marking was short-lived. When the Chief Signal Officer of the Army learned of the markings, he ordered that all “mutilation of government property be stopped immediately”.¹⁵ A photograph of Army aircraft taken in the spring of 1917 shows that those aircraft had no markings other than identification numbers.¹⁶

World War I

The Great War, the “War to End All Wars”, brought many technical innovations—among them faster, deadlier aircraft and the means to defend against them. Early aviators in that war considered themselves “knights of the air”, in fact, they would often wave or salute as they passed each other on their way to scout the enemy side. This was the norm until one cunning pilot armed himself and shot at his airborne adversaries. The beginning of aerial warfare led to the development of national insignias. Some years before the war, The Hague Committee considered the possible need for national air insignia, but no action was taken.¹⁷ Years later the air insignia would be considered the aviation equivalent of the national flag, and aircraft without insignia would be considered outlaws.¹⁸

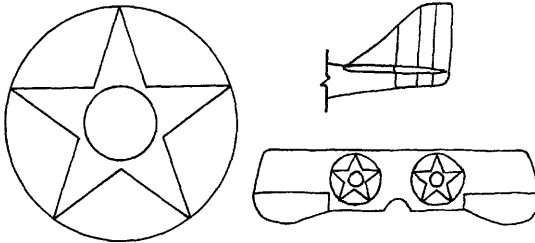
¹⁵ Jeffrey P. Rhodes, “Stars on the Wing” *Air Force Magazine*, June 1987, 79-83.

¹⁶ Lieutenant Colonel Nick P. Apple and Lieutenant Colonel Gene Gurney, *The Air Force Museum* (New York: Crown Publishers, 1975), 49.

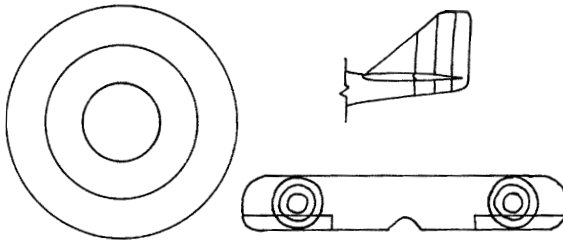
¹⁷ Bruce Robertson, *Aircraft Camouflage and Markings: 1907-1954* (Falbrook, California: Aero Publishers, 1966), 6th edition, 9-10.

¹⁸ Robert F. Dorr, *Fighting Colors: Glory Days of U.S. Aircraft Markings* (Osceola, Wisconsin: Motorbooks International, 1990), 10.

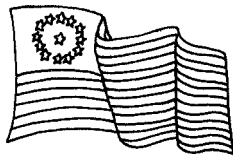
Plate 3: World War I Roundels



*U.S. National Air Insignia, 1917. Left: roundel, from center R/W/B.
Right upper: tail markings forward to aft, B-W-R.
Lower: placement of roundels on wings.*



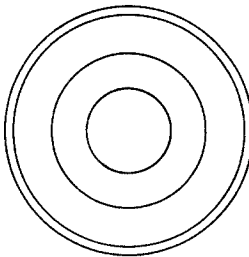
*American Expeditionary Forces (AEF) air insignia, 1918.
Left: roundel, from center W/B/R.
Right upper: tail markings forward to aft, R-W-B.
Lower: placement of roundels on wings.*



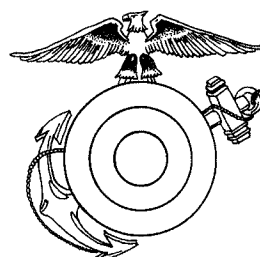
U.S. Navy Flying Boats.



8th Aero Squadron badge.



*AEF roundel with white
outer ring.*



*U.S. Marine Corps
variant.*

The French introduced the tricolored roundel as well as tail stripes (the aviation roundel would become the most common form of national aircraft insignia in the world). After trying several unsatisfactory markings, the British adopted the French tail stripes and reversed the colors of the roundel.

As war raged in Europe, America remained neutral until 1917, when General Pershing once again led the nation's armed forces into action. Arriving in Europe, he organized the American Expeditionary Forces (AEF). In preparation, the Army and Navy air services adopted a distinctive national roundel, designed by Private Roland S. Knolson of the 1st Aero Company of the New York National Guard. Inspired by the Allied air roundels, he started with the star from the American flag and added a red dot from the color of the stripes. On 4 May 1917, the Aeronautical Division of the Signal Corps requested that this design be adopted for the air services by the recently appointed Joint Army and Navy Board on Aeronautical Cognizance. On 17 May 1917 the Army and Navy air services officially adopted the new insignia.¹⁹

On 19 May 1917, General Order No. 299, signed by Secretary of the Navy Josephus Daniels, called for the "application of a distinguishing national insignia for all United States Government aircraft ..." The insignia consisted of a blue roundel charged with a white five-pointed star of equal diameter. At the center was a red disk positioned entirely within the star. The new specifications also called for tail stripes in the national colors, similar to the Allied stripes but in the reverse order. The stripes, confined to the rudder, were blue, white, and red, from forward to aft (Plate 3). Regulations set the placement of the insignia on the port and starboard positions of the wings on the upper and lower sides. There were also specifications for the placement of the insignia and tail stripes on balloons.²⁰ On 6 June 1917, the U.S. Government informed the French Under-Secretary of State that the air services of the Army and Navy had adopted a new national air insignia.²¹

Once in Europe, the inexperienced American aviators would have to overcome many obstacles, the least expected of these would be identification. Some French pilots had noted that from a distance the star insignia on the American

¹⁹ Robert D. Archer, *The Official Monogram U.S. Army Air Service & Air Corps Aircraft Color Guide* (Sturbridge, Massachusetts: Monogram Aviation Publications, 1995), 113.

²⁰ United States Navy Dept. *General Order No. 299: Distinguishing Insignia for United States Aircraft* (Washington, D.C.: 19 May 1917).

²¹ Archer, 115.

trainers tended to resemble the German white cross insignia.²² Colonel William S. “Billy” Mitchell suggested that for commonality with the Allies, U.S. aerial forces adopt a tricolored roundel of white, blue, and red, from the center to the outside. Adopted on 8 February 1918, the new insignia became known as the AEF roundel.²³ It happened to match closely the roundel used by the Russian Imperial Air Service. The roundels, which had been placed near the aircraft centerline, were now at mid-wing or near the wing tips. Also, the order of the tail stripes was reversed to conform to the French and British designs (Plate 3).²⁴

The new system was not foolproof. European manufacturers of American combat aircraft often applied the new markings incorrectly. A French plane maker painted the rudder stripes with blue and red from forward to aft to match the American roundel. A quick application of paint corrected that error. Because the British and Italian air forces placed a roundel on the fuselage sides of their aircraft, manufacturers from those countries painted roundels on the sides of aircraft for delivery to the Americans. Again, paint changed the Italian or British roundels into an AEF roundel.

While it was not standard for Army aircraft to place a roundel on the fuselage, Navy flying boats painted the roundel on each side of the hull.²⁵ There were other variations of the placement of the roundels or of the roundel itself. On some biplanes the roundels were painted on the lower side of the upper wing. On others they were painted on the lower side of the lower wing (Plate 4). In the British fashion, the roundels on aircraft with dark green and brown camouflage had a narrow white ring added to the outer edge of the AEF roundel. The Marine Corps adopted a variation of the roundel to give it a Marine character, adding the eagle and anchor from the Marine Corps badge. This variant was placed on the sides of the fuselage only.²⁶ The 8th Aero Squad-

²² Gordon Swanborough and Peter M. Bowers, *United States Military Aircraft Since 1908* (London: Putnam, 1989), 30.

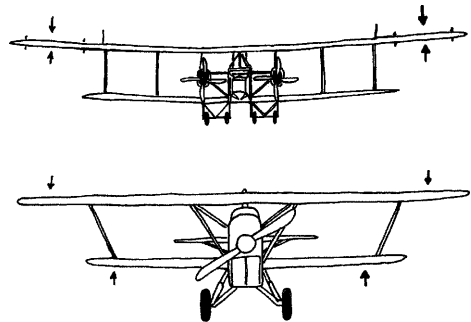
²³ Enzo Angelucci, *The American Fighter* (New York: Orion Books, 1985), 19.

²⁴ Swanborough and Bowers, 31. Interestingly, this eventually amounted to an even exchange of markings. The Soviet Union would adopt the red star as its national air insignia. Decades later the U.S. armed forces would organize combat training units that simulated Soviet weapons and tactics. Known as “Aggressor” forces, these units would adopt the red star as their distinguishing insignia. Annual air combat exercises in the Nevada desert became known as “Red Flag”.

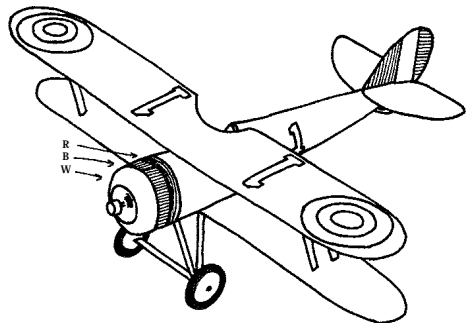
²⁵ Robertson, 54.

²⁶ *Ibid.* This insignia was designed by Major Alfred A. Cunningham, U.S.M.C., commander of Marine aviation in Europe during World War I.

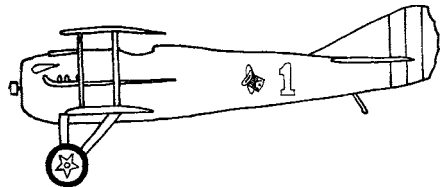
Plate 4: World War I Markings



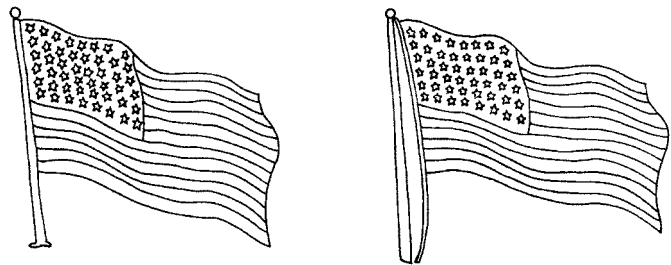
Arrows indicate position of national roundels on aircraft. Above: Handly/Page Bomber with large wingspan. Below: small fighter. These drawings are not to the same scale.



First Lieutenant Eddie Rickenbacker's Nieuport 28C.1.



Captain Eddie Rickenbacker's SPAD S.VII. Wheel hub R/W/B.



1st Aero Squadron badge variants.

ron superimposed an eagle and Liberty Bell on the roundel for use as its squadron badge.²⁷ Some flying boats were marked with a 13-star U.S. flag (Plate 3).²⁸ Manned observation balloons were also required to bear the national marking. Before the war tethered observation balloons displayed the U.S. flag at the stern.²⁹

Perhaps the most unusual placement of the roundel was on the Nieuport 28C.1 flown by then-First Lieutenant Eddie Rickenbacker. The circular engine cowling of his aircraft was painted with white, blue, and red stripes. When viewed head-on, the stripes looked like the AEF roundel (Plate 4).³⁰ Normally, the wheel hubs of the landing gear were painted a solid color or in a distinctive squadron pattern. The SPAD S.VII flown by a newly promoted Captain Rickenbacker had wheel hubs painted with the old star-and-disk roundel (Plate 4).³¹ And at least one aircraft had wheel hubs painted with the AEF roundel.³²

Early on, the Germans were confused about the actual American marking. While initial reports had the Americans using the prewar star and disk roundel, that marking was actually only used stateside; the AEF roundel was for use in Europe. When the U.S. 1st Aero Squadron began flying over the German lines, the Germans mistook the U.S. flag painted on the sides of their aircraft as the national marking. The flag was actually the badge of the 1st Aero Squadron (Plate 4).³³ The AEF roundel also became the shoulder patch for U.S. aviation troops in Europe.³⁴ For some units the AEF roundel was only part of the design on their patch.³⁵

²⁷ *Ibid.*

²⁸ Woodhouse, 277.

²⁹ *Ibid.*, 219.

³⁰ Glencoe Models: *Nieuport 28C.1*. One of six paint schemes for this model aircraft. Because aviation hobbyists demand accuracy in the models that they build, model makers go to great lengths to provide authentic markings for any given aircraft; this can be considered a reliable source of information.

³¹ Len Cacutt, ed., *Classics of the Air: An Illustrated History of the Development of Military Planes from 1913-1935* (New York: Exeter Books, 1988), 27.

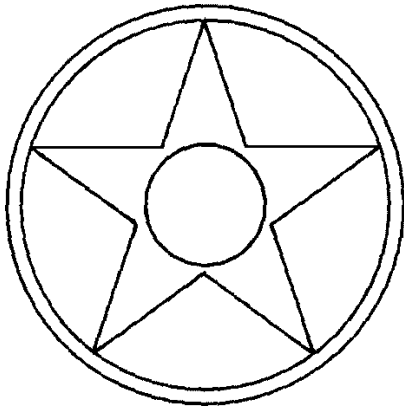
³² Bruce Robertson, ed., *United States Army and Air Force Fighters: 1916-1961* (Letchworth, England: Harleyford Publications, 1961), 12.

³³ Robertson, *Aircraft Camouflage and Markings*, 54

³⁴ J. Duncan Campbell, *Aviation Badges and Insignia of the United States Army: 1913-1946* (Harrisburg, Pennsylvania: Triangle Press, 1977), 49-50.

³⁵ Jack Britton and George Washington, Jr., *U.S. Military Shoulder Patches of the United States Armed Forces*, 5th ed. (Tulsa, Oklahoma: M.C.N. Press, 1990), 49.

Plate 5: Between the Wars



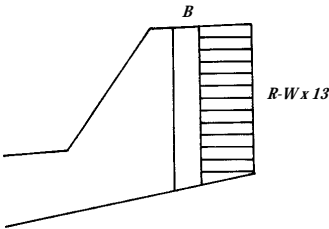
R/W/B/W

U.S. national roundel with W outer ring.



R W B

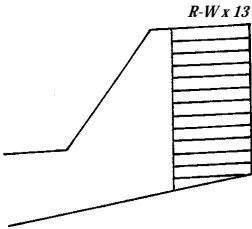
Experimental national markings recommended by Report 1305.



B

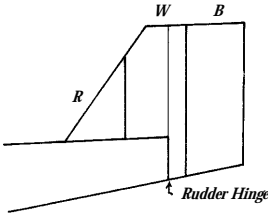
R-W x 13

U.S. Army tail stripes, 1926-1942



R-W x 13

U.S. Navy tail stripes, Jan.-May 1942



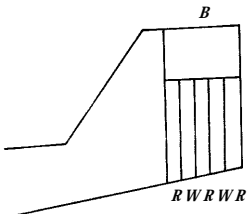
W

B

R

Rudder Hinge

*U.S. Coast Guard tail stripes,
1927-1936*



B

R W R W R

*U.S. Coast Guard tail stripes,
1936-1941*

Coast Guard aviation was born during the First World War. However, because its planes were limited to maritime patrol in home waters, they did not display the AEF roundel. Rather, since during wartime the Coast Guard falls under naval administration, it used U.S. Navy markings.³⁶

Between the Wars

Armistice brought the end of the AEF roundel. On 19 August 1919, the star roundel and the pre-war tail stripes were re-authorized, although there was no rush to change back to the old insignia. Often this was done when a wing received a new fabric covering, which sometimes resulted in aircraft displaying an old and new insignia on different wings. Changeover of national markings was to be completed by 1 January 1920.³⁷ The roundels would be placed toward the wingtips rather than towards the centerline. On Marine Corps aircraft, the globe was restored to the Marine Corps badge. On aircraft imported from Britain, the British roundels were over-painted with the star roundel, but retained the narrow white ring around the roundel (Plate 5).³⁸

Early in 1920, the Army ran tests on the distinguishability of the American roundel, finding that patriotism, rather than science, had designed the national insignia. Tests showed that the insignia became less distinct as distance increased. The Army tested various geometric forms, but in the end a panel recommended three bars of red, white, and blue running forward to aft, painted on the starboard side of the upper wing and lower wing. This design would be more recognizable at a great distance (Plate 5) and distinct from any other nation's air insignia. However, due to budget cuts, the existing insignia was retained. But the findings of *Report 1305* would not be forgotten; 23 years later they would later influence the design and placement of the national air insignia.³⁹

During the inter-war years, the Navy operated a zeppelin, three large dirigibles, and a number of smaller airships and balloons. The zeppelin *Los Angeles* bore three national air insignias, one below and one on each side. The lower insignia had one point of the star oriented forward. The lower and upper rudders were painted with the American rudder stripes. The American-built dirigible *Shenandoah* was similarly marked, but with the stars on the side

³⁶ United States, Department of the Navy, Naval Historical Center, *U.S. Naval Aircraft Markings* (1994), 1.

³⁷ Angelucci, 20.

³⁸ *Ibid.* and Archer, 174.

³⁹ Archer, 121, 129-132.

insignias pointing toward the nose. The airships USS *Akron* and USS *Macon* (the only aircraft ever to bear the “USS” designation) were marked like the *Los Angeles*. The small airship ZMC-2, in service from 1929-1940, did not bear the national air insignia, but was marked “U.S. NAVY” on both sides. All of its rear control surfaces bore the American tail stripes (Plate 6). At the very end it flew a small American flag.⁴⁰ The markings on Army airships were slightly different from the Navy’s. The national air insignia was placed only at the top and bottom of each airship. On spherical balloons the insignia was placed on opposite sides, one placed 45° above the horizontal plane, the other 45° below. On observation balloons, the insignia was placed only at the bottom (Plate 6).⁴¹

On 10 August 1926 Charles N. Monteiff, chief engineer for the Boeing Airplane Company, suggested that military aircraft adopt new rudder stripes. Because the stripes used at the time formed the French flag, he felt that a design that resembled the U.S. flag would be more appropriate. After careful consideration, the Secretary of War approved the design on 3 November 1926, and the Army formally adopted it on 24 January 1927. The new design had a blue vertical stripe at the rudderpost equal to 1/3 of the rudder’s surface. The remaining area was divided horizontally into thirteen red and white stripes (Plate 5).⁴²

The end of the Great War also ended Coast Guard aviation until it was resurrected to help enforce Prohibition, and on 26 March 1926 Congress approved the purchase of seaplanes. In 1927, Coast Guard aviation was again operational, and along with it came a new national marking. Initially, the entire vertical control surface was painted with three equal vertical stripes of red, white, and blue, forward to aft. Then in 1936 Coast Guard tail marking changed again. Reminiscent of the adoption of the Revenue Cutter Ensign in 1799, the top third of the rudder was painted blue while the remaining two-thirds was divided into five equal vertical stripes of red and white (Plate 5).⁴³

On 31 January 1931, citing tactical considerations, the Navy removed the vertical tail stripes from some aircraft, replacing the rudder stripes with squadron colors and markings. The tail stripes remained on aircraft of the

⁴⁰ William J. White, *Airships of the Future* (New York: Sterling Publishing, 1976), 18, 41, 43, 53, 55, 135.

⁴¹ Archer, 233.

⁴² *Ibid.*, 134-135.

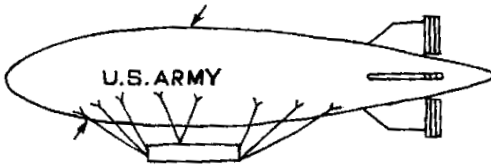
⁴³ William T. Larkins, *U.S. Navy Aircraft: 1921-1941* (Atglen, Pennsylvania: Schiffer Military/Aviation History, 1995), 363.

Plate 6: Airships, Blimps, and Balloons

Arrows indicate position of U.S. National Roundel.



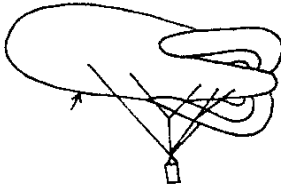
U.S. Navy airship bearing three U.S. roundels and rudder stripes on all four rear control surfaces.



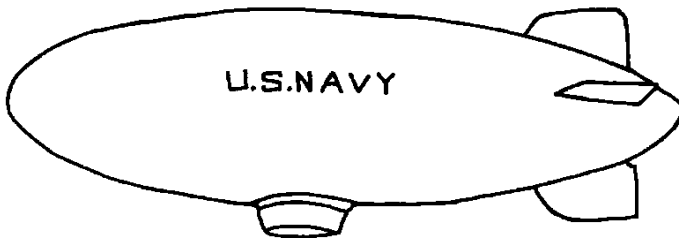
U.S. Army Airship bearing two U.S. roundels and rudder stripes on all four rear control surfaces.



Spherical balloon



Observation balloon.



U.S. Navy patrol blimp, World War II. N letters/Ag background.

Marine Corps and on certain naval aircraft and airships.⁴⁴

The 1930s saw the rise of aggressive totalitarian regimes in Europe and Asia; America again responded by declaring neutrality. Although the U.S. was neutral in policy, its actions were not. It banned the export of strategic materials to Japan and began providing arms to Britain, ordering the U.S. Navy to escort supply convoys crossing the Atlantic. Despite its declared neutrality, the U.S. Navy actively engaged German U-boats on the high seas, ultimately leading to its first loss, the sinking of the USS *Reuben James* on 31 October 1941.

Along the American coast, U.S. Army aircraft displayed “Neutrality” markings while engaging in Atlantic and Pacific anti-submarine patrol or when entering a declared war zone.⁴⁵ These aircraft were painted with the American flag as large as practical on the fuselage. On some aircraft, the hoist of the flag faced forward; on others the flag’s obverse was painted on both starboard and port sides of the fuselage. On some bombers, the flag was painted on the top of the fuselage. Civilian transports also displayed the flag marking.⁴⁶

As war drew near, Army, Navy, and Marine Corps air services began to paint their aircraft in a variety of camouflage schemes. Along with this came a change in the placement of the national air insignia. In February of 1941, the national air insignia was restricted to the upper left and the lower right of each wing. This eliminated a balanced target when engaged in combat and facilitated identification of friend and foe. The rudder stripes were also eliminated from camouflaged aircraft.⁴⁷ On 19 March 1940, Navy aircraft engaged in neutrality patrol were ordered to paint a second national air insignia on each side of the aircraft (Plate 7).⁴⁸

World War II

“Yesterday, December 7th, 1941, a date which will live in infamy, the United States was suddenly and deliberately attacked by the naval and air forces of the Empire of Japan.” With these words, President Franklin Delano Roosevelt awoke America from its self-imposed illusion of geographic isolation. As the

⁴⁴ *U.S. Naval Aircraft Markings*, 3.

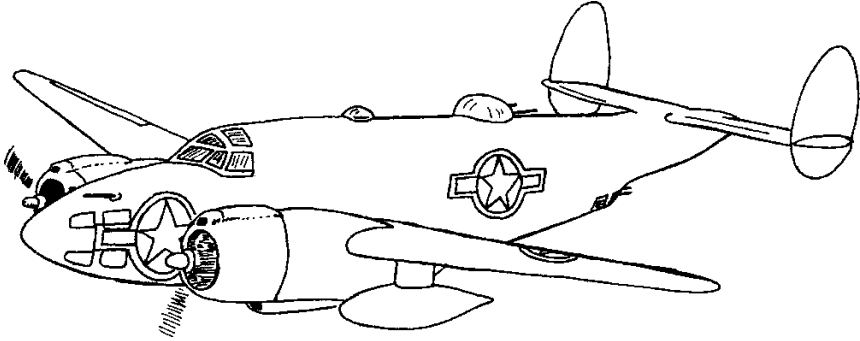
⁴⁵ Robertson, *Aircraft Camouflage and Markings*, 137.

⁴⁶ David Monday, *Concise Guide to American Aircraft of World War II* (London: Temple Press, 1982), 33, 51, 80.

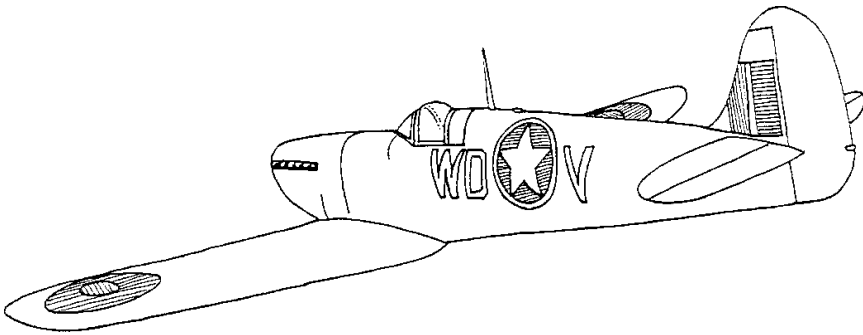
⁴⁷ Robertson, *Aircraft Camouflage and Markings*, 137.

⁴⁸ *U.S. Naval Aircraft and Markings*, 5.

Plate 7: World War II Aircraft Markings



U.S. Navy PV-1 "Ventura" patrol plane. This aircraft shows two U.S. National Air Insignia on each side of the fuselage. Apparently these were the only U.S. aircraft with these dual markings. The double markings were kept until late 1943.



British built "Spitfire" fighter with U.S. and British roundels. The red, white and blue tail stripes are the British fin flash. Some U.S. aircraft kept them until late 1943.

nation mobilized for war, national aircraft markings did not change. However, one of the immediate effects was the removal and replacement of national air insignias on aircraft in the Lend-Lease program. However, British aircrews became somewhat lax in removing American insignia now that the United States had joined the war, which resulted in some aircraft bearing the national air insignia of two different nations, in clear violation of international law. The first such occurrences seem to have been on American-made aircraft being ferried to Britain.⁴⁹

With the American declaration of war, the U.S. Army Air Force began to form squadrons at bases in Britain, initially using British aircraft. While training, American aircraft briefly bore both U.S. and British markings. While the British roundels were removed for actual combat operations, they retained the British fin flash. The “fin flash” had evolved from the Allied tail stripes of World War I (Plate 7).⁵⁰ With the outbreak of war, the Coast Guard was once again put under Navy command and its aircraft marked like their naval counterparts with the national aircraft insignia.⁵¹

The next change in the national aircraft markings on U.S. Navy aircraft occurred on 5 January 1942, nearly a month after the attack on Pearl Harbor. The national air insignia was now displayed in six places: both sides of the fuselage and the upper and lower surfaces of each wing. This date also saw the adoption of thirteen red and white horizontal stripes on the rudder (Plate 5).⁵² On 15 May 1942, the red central disk was removed from the national air insignia to keep nervous anti-aircraft gunners from confusing the American insignia with the Japanese *Hinomaru* national air insignia, a red disk American servicemen called the “meatball” (Plate 8). That order also required all Army and Navy aircraft to remove the national rudder stripes.⁵³

Perhaps to avoid getting shot down by trigger-happy Americans, the British air forces in the South East Asia Command area also changed their reduced-visibility roundel of blue and red to blue and light blue, and the Royal Australian Air Force changed its roundel from blue, white, and red to blue, white, and blue.⁵⁴

⁴⁹ Robertson, *Aircraft Camouflage and Markings*, 95.

⁵⁰ *Ibid.*, 143.

⁵¹ *Ibid.*, 142.

⁵² *U.S. Naval Aircraft Markings*, 5.

⁵³ Angelucci, 20.

⁵⁴ Robertson, *Aircraft Camouflage and Markings*, 133.

Some aircraft bore no national markings at all. On 16 June 1942, Congress authorized the construction of a large fleet of coastal patrol blimps. These self-propelled airships served in the Atlantic, Pacific, and the Mediterranean. The unusual feature of these aircraft is that they bore no national air insignias or flags, but were identified by the marking "U.S. NAVY" in large black letters on the port and starboard sides (Plate 6).⁵⁵

On 4 July 1942, U.S. Army Air Forces began combat operations in Europe. In addition to the British fin flash, American aircraft in Europe and North Africa unofficially adopted a yellow outer ring to the national air insignia. The British had introduced this yellow ring to aid in aircraft identification (Plate 8). The ring was approximately 2 inches wide,⁵⁶ but this measurement varied on many aircraft. Some examples seem quite narrow and others are so wide that the yellow ring on one side of the aircraft overlaps with the ring on the other side. On some aircraft, the yellow ring was added to the wing roundels, on others it was not, in the British fashion. Later in the war many of the yellow rings were painted over, giving the roundel the appearance of having a dark green ring.

To help reduce the possibility of detection, Navy camouflage aircraft changed the white star in the national insignia to a very light shade of gray achieved by mixing Navy gray and white paints.⁵⁷ The Army also appears to have adopted, unofficially at least, two subdued versions of the national air insignia, but apparently never made any of these modifications. Color photos of B-17 and B-24 bombers show the star painted the same olive drab as the aircraft's camouflage.⁵⁸ Some black and white photos show the star in the same shade of gray as the rest of the painted surface of the aircraft (which could indicate that the star and the plane were the same color). The other variation was the application of light gray to the white star. This was applied to a limited number of aircraft in olive drab and black paint schemes.⁵⁹

⁵⁵ White, 71, 74.

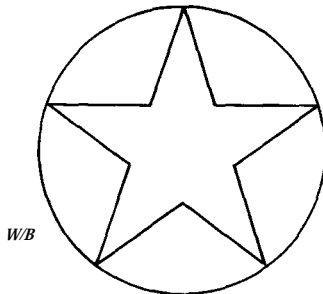
⁵⁶ N. L. Avery, *B-25 Mitchell: The Magnificent Medium* (St. Paul, Minnesota: Phalanx Publishing, 1992), 173. Wheeler, 88. Officially, the roundel would only be on the port upper and starboard lower wings. The 488th Bomb Squadron (Medium), 340th Bomb Group, U.S. 9th Air Force in North Africa, used the yellow circled insignia on the upper and lower port and starboard positions during early 1943. Apparently this was to prevent mistaken identity.

⁵⁷ Robertson, *Aircraft Camouflage and Markings*, 141.

⁵⁸ Mondey, 21, 49.

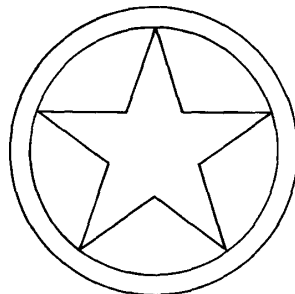
⁵⁹ Angelucci, 22.

Plate 8: U.S. Roundels in World War II



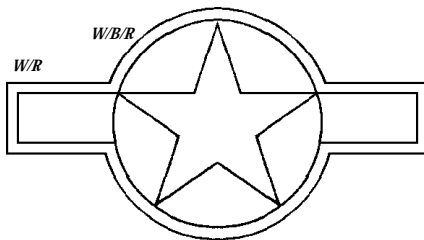
W/B

U.S. Roundel
15 May 1942–28 June 1943



W/B/Y+

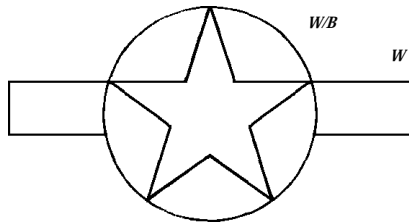
U.S. Roundel variant. U.S. Army, Europe and North Africa; U.S. Navy, Operation "Torch" November 1942.



W/R

W/B/R

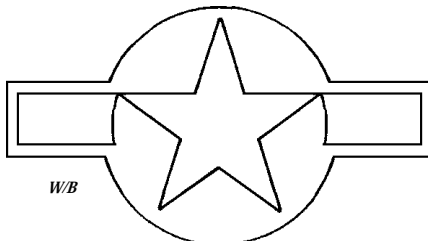
U.S. National Air Insignia
28 June 1943–14 September 1943.



W/B

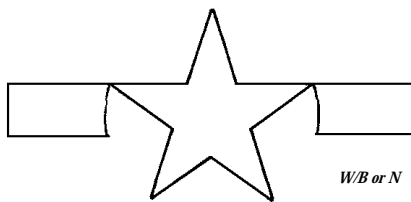
W

Experimental version, Pacific Theater
March 1943–28 June 1943.



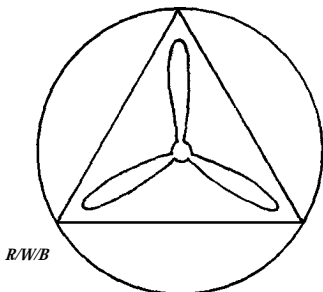
W/B

U.S. National Air Insignia
14 September 1943–14 January 1947



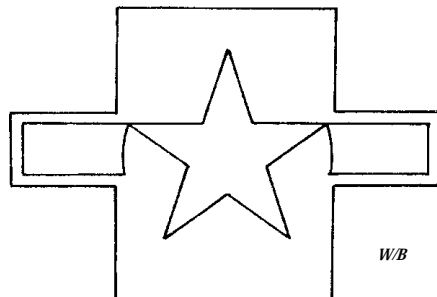
W/B or N

Naval variant used
on dark backgrounds.



R/W/B

U.S. Civil Air Patrol Roundel, February
1942–September 1945 (?).



W/B

Unofficial variant,
Western Pacific.

Early in the war, the national air insignia varied greatly. Aircraft appeared with the yellow ringed roundel along with the American flag (in various positions), the roundel without the yellow ring but with the flag, the roundel with the yellow ring and the British fin flash, and the roundel with an olive drab or gray star with and without the British fin flash. U.S. Air Force histories of the national air insignia overlook these variants.⁶⁰

With all of the variations of the national air insignia, 1942 also saw a new national air insignia for the paramilitary aircraft of the Civil Air Patrol. Formed on 1 December 1941, CAP enlisted the help of civil aviation in the war effort. Although CAP had the support of the Army Air Force, it used private planes flown by unpaid civilian aviators. They performed anti-submarine patrol, courier services, search and rescue, and many other vital functions.

The CAP insignia was a blue roundel with a white equilateral triangle charged with a red three-bladed propeller (Plate 8). The U.S. State Department sent out diplomatic dispatches describing patrol uniforms and insignia so that in the event of their capture, CAP members would be treated as prisoners of war rather than guerillas. The insignia was applied to each side of their aircraft and on the upper left and lower right of each wing. Each aircraft also displayed its individual civil radio call sign.⁶¹ The CAP insignia appears to have begun in February 1942, when the CAP "National Patch" was authorized for use.⁶² Use of the CAP roundel seems to have ended with the close of hostilities.

On 1 February 1943, the Navy made a final change in its placement of the national air insignia. In addition to its position on each side of the fuselage, the national air insignia was now limited to the upper left and lower right wings.⁶³

As the war dragged on, military analysts reasoned that the circular insignia might be confused with the red *Hinomaru* of Japan or the German *Maltakreuz* at a distance. They remembered the findings of *Report No. 1305*,

⁶⁰ Bill Yenne, *History of the U.S. Air Force* (Stamford, Connecticut: Brompton Books, 1992), s.v. "Evolution of the U. S. National Insignia", 253, and Charles D. Bright, *Historical Dictionary of the U.S. Air Force* (New York: Greenwood Press, 1992), s.v. "Insignia", 295.

⁶¹ Robert Neprud, *Flying Minute Men: The Story of the Civil Air Patrol* (New York: Duell, Sloan, and Pearce, 1988).

⁶² Major Lee Ragan, C.A.P., *The Collector's Catalog of Civil Air Patrol Insignia: 1942-1985* (National Historical Committee, Civil Air Patrol, 1986), 91.

⁶³ *U.S. Naval Aircraft Markings*, 6.

released in 1920, and on 28 June 1943, a new national air insignia went into effect. It added two white bars or “wings” on either side of the roundel. The length of each bar was equal to the radius of the roundel. The width was equal to half the radius. The whole was surrounded by a red border equal to 1/8 the radius of the roundel (Plate 8). Tests at Elgin Field, Florida found the new insignia 60% more recognizable than other insignias.⁶⁴

An early experimental version of the insignia may have been applied to B-25 “Mitchell” bombers of the 63rd Bomb Squadron, 3rd Bomb Group, 5th Air Force serving in the Southwest Pacific. During the Battle of the Bismarck Sea (3-5 March 1943) these planes were photographed with the white bars that would be authorized three months later. This version of the insignia did not yet have the red border (Plate 8).⁶⁵ As soon as the new marking went into effect, many voiced the fear that the red in the new insignia might be confused with the red sun disk of Japan.⁶⁶

Although the flag marking was adopted before the war for use in the Atlantic and Pacific areas, during the war it seems to have been confined to use in Europe and North Africa. After the adoption of the newly modified national air insignia, the flag marking seems to have disappeared altogether. The British fin flash seems to continued a little longer, but it was gone by late 1943.⁶⁷ The British also thought that the modified marking was a good idea, and in 1943 British forces in the Pacific also added wings to their national roundel.⁶⁸

Opposition to the red border around the national air insignia led to a change to blue on 14 September 1943. The national air insignia would retain this form throughout the rest of the war with only some minor modifications.⁶⁹ Photos of the aircraft with the newly authorized blue borders show that some were haphazardly applied. Often the blue paint of the border was darker than the sun-faded blue of the insignia. On naval aircraft with dark

⁶⁴ Robertson, *Aircraft Markings and Camouflage*, 137.

⁶⁵ C. V. Glines, “Victory in the Bismark Sea”, *Air Force Magazine* (Arlington, VA: Air Force Association), August 1996, Vol. 79, No. 8, 89-93 and Charles A. Mendenhall, *Deadly Duo: The B-25 and the B-26 in WWII* (Osceola, Wisconsin: Specialty Press, 1981), 60.

⁶⁶ Rhodes, 82

⁶⁷ Monday, 193. Aircraft of the 487th Bomb Squadron, 340th Bomb Group, 12th Air Force, were marked with the red-bordered national air insignia and the British fin flash as late as September 1943.

⁶⁸ Robertson, *Aircraft Camouflage and Markings*, 133.

⁶⁹ *Ibid.*, 137, 147.

blue or black paint schemes, only the star and bars were applied to the fuselage and wings (Plate 8).⁷⁰

Another variant appeared on some P-47 “Thunderbolt” fighters operating in the Pacific theatre. A vertical blue identification stripe, equal to the radius of the roundel portion of the insignia, was painted on the wings. A white star was centered on the blue stripe and the blue-bordered white wings protruded from each side of the stripe (Plate 8).⁷¹ The Army Air Forces in Europe continued to modify the white in the insignia to light gray. After the establishment of air superiority, the white portions were restored and camouflage gradually fell into disuse.⁷²

The wings were adopted not only by the British Empire in the Far East, but also by the Italian Co-Belligerent Air Force. Liberated Italians fighting alongside the Allies after the fall of Fascist Italy discarded the Fascist air insignia and readopted the green, white, and red roundel, but added light blue wings and a dark blue border overall.⁷³

When the Free French took to the air they adopted a white roundel with a red Cross of Lorraine to differentiate themselves from the Vichy French Air Force. Both the Vichy French and the Free French continued to use the red, white, and blue French roundel. The Vichy French added red and yellow identification stripes to their aircraft. Some Free French added the American-style wings with a dark blue border to their roundel of yellow, red, white, and blue.⁷⁴

Although all of the Latin American republics declared war against the Axis, only Mexico and Brazil actually sent fighting forces to the front. Mexico sent the 201st Fighter Squadron, Mexican Expeditionary Air Force. The *Aguilas Aztecas* (Aztec Eagles) provided close air support and bombing missions for American troops in the Philippines. They flew metal-finish P-47Ds with a combination of American and Mexican markings. The upper right and lower left wings bore the triangular cockade of Mexico and the rudders were painted in the tricolor of the Mexican flag. To assist in identification, the planes bore the American national air insignia on the upper left and lower right wings and on each side of the fuselage (in violation of international law!) (Plate 9).⁷⁵

⁷⁰ *Ibid.*, 147.

⁷¹ Angelucci, 22.

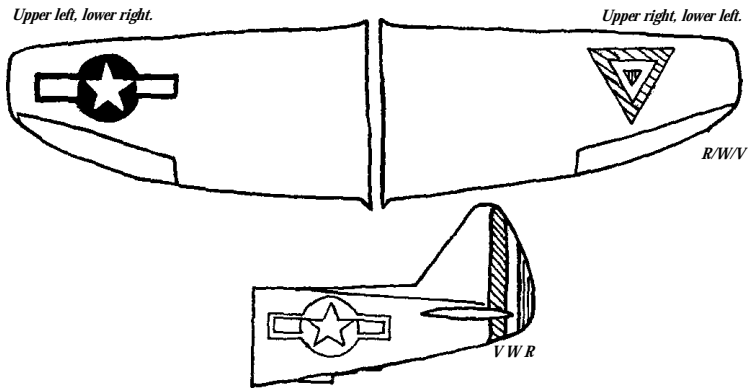
⁷² Robertson, *Aircraft Camouflage and Markings*, 150.

⁷³ Mondey, 13.

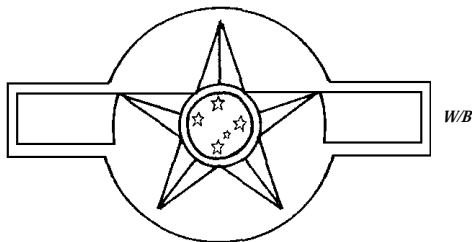
⁷⁴ Mendenhall, 83.

⁷⁵ Michael O’Leary, *USAAF Fighters in World War Two in Action*, (New York: Blanford Press, 1986), 267, 268 and *Mexico’s Squadron 201*, written, directed, and produced by Rick Leal, narrated by Bill Elliot (PBS, KMBH-TV Harlingen, Texas, 1992).

Plate 9: U.S. Allies' Roundels in World War II

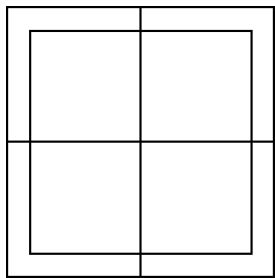


*Markings of 201st Squadron, Mexican Expeditionary Air Force,
Western Pacific, 1945.*



W/B/W/Star: V-Y x 10/B

Brazilian Air Force, Italian Front, 1945.



*1 & 4: W bordered R
2 & 3 R bordered W*

*Polish national marking.
Polish pilots flew with the
U.S. 56th Fighter Group.*



*China Air Task Force roundel,
China/Burma, India Theater.*

The Brazilian 1st Fighter Group, which flew camouflaged P-47Ds, provided close air support on the Italian front. Rather than use a combination of markings, the Brazilian Air Force modified its national air insignia, placing Brazil's green and yellow star over the white American star. The rudders had the traditional green and yellow vertical stripes (Plate 9).⁷⁶

After the fall of Poland, many members of the Polish Air Force not captured by the Germans made their way via the Soviet Union to France. There they flew with the French Air Force using a combination of markings. After the fall of France, the free Poles flew with the Royal Air Force, the Soviet Air Force, and the U.S. Army Air Force. Flying P-47Ds with the U.S. 56th Fighter Group, Polish aircraft bore the U.S. national air insignia on the wings and fuselage. The red and white Polish national air insignia was painted on the port and starboard sides of the engine cowling (Plate 9).⁷⁷

In addition to producing many of its own aircraft, the Soviet Union received many American-built aircraft through the Lend-Lease program. Planes designated for Russian use had white roundels charged with a red star (identical to the U.S. Army Signal Corps markings used in 1917). The Soviets modified the markings to conform to their own standards. At the time, the Soviet insignia was a plain red star, sometimes with a narrow white or yellow border.⁷⁸

The most unusual marking on American aircraft was used by the U.S./China composite unit, the China Air Task Force. CATF operated in the China/Burma/India theatre of operations and flew C-47 cargo aircraft. Rather than using U.S. or Chinese air force markings, it used a roundel bearing a large Chinese character (Plate 9), placed on each side of the fuselage. The tail bore no special marking.⁷⁹ The source does not explain the significance of the character or the colors used, but it was likely black with a white character (although the photo of the CATF aircraft is not in color). The CATF roundel was very similar to the U.S. Army's "Chung" patch, awarded to personnel of the U.S. 15th Infantry Regiment who achieved proficiency in Mandarin Chinese: a black roundel with a red character identical to the CATF character.⁸⁰

At the end of the war, the United States controlled the greatest aerial

⁷⁶ Monney, 219.

⁷⁷ Dr. Jan Koniarek, *Polish Air Force: 1939-1945* (Carrolton, Texas: Squadron/Signal, 1994), 37, 58.

⁷⁸ Various sources.

⁷⁹ Larry Davis, *C-47 Skytrain in Action* (Carrolton, Texas: Squadron/Signal, 1995), 33.

⁸⁰ Jack Britton and George Washington, Jr., 14, 81.

armada in history. The U.S. national air insignia had evolved from an unofficial local marking on aircraft of a third-rate air force to the emblem of the most powerful armed force in the world. This insignia would continue to evolve due to tactical necessity. It would also influence the design of the air insignias of other nations as well.

Post-War and Cold War

The period immediately after the war saw no change in the national air insignia. With Japan no longer a military threat, the national air insignia could once again be red, white, and blue. On 14 January 1947, the Army and Navy added a red horizontal stripe to the white bars of the national air insignia (Plate 10).⁸¹ Although the insignia retains this form today, the Cold War and practical necessity would require further modification and evolution. Official and unofficial histories often recognize only a few of these.

The Navy used the first variant of the new national air insignia. On aircraft painted dark insignia blue or black, only the white stars and bars and the red stripes were applied to the fuselage and wings (Plate 10).⁸² Another variant adopted by the Navy, and later the Air Force, was used on aircraft painted with white upper surfaces and insignia blue undersides. The upper edge of the blue bar border was applied flush with the edge of the blue of the aircraft with the roundel portion appearing as a hump protruding into the white area (Plate 10).⁸³

The few attempts to revive the prewar tail stripes never caught on.⁸⁴ In the 1970s the USAF 2nd Fighter Interceptor Training Squadron used the prewar tail stripes (thirteen horizontal stripes, red and white, behind a vertical blue stripe) as their squadron marking. It also added thirteen white stars to the blue stripe (Plate 11).⁸⁵

An asymmetrical emblem such as the national air insignia needs uniformity in its application on aircraft. Since the wings of aircraft were normally at a 90° angle from the fuselage, the insignia was applied accordingly. After the war, captured German aviation engineers brought “swept wing” technology to the U.S., and soon the swept wing F-86 “Sabre” fighter debuted and went on

⁸¹ *U.S. Naval Aircraft Markings*, 4, 8.

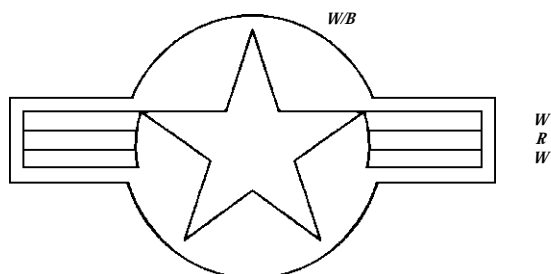
⁸² *Ibid.*, 4.

⁸³ Photos in various sources.

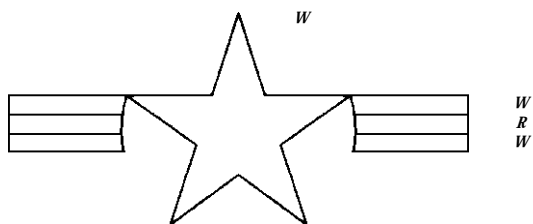
⁸⁴ Robertson, *Aircraft Camouflage and Markings*, 178.

⁸⁵ Kevin Keaveney, *McDonnell F101B/F* (Arlington, Texas: Aerofax, Inc., 1984), 4, 5, 23.

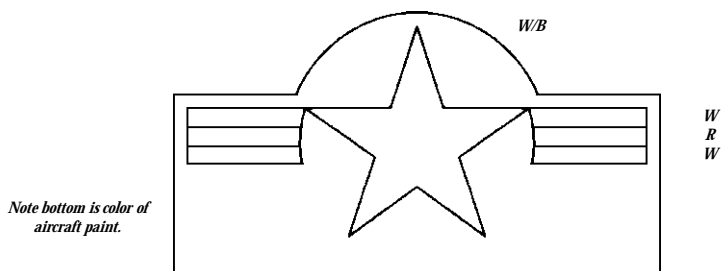
Plate 10: Post-War National Air Insignia



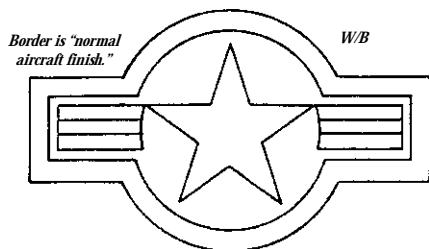
14 January 1947–present.



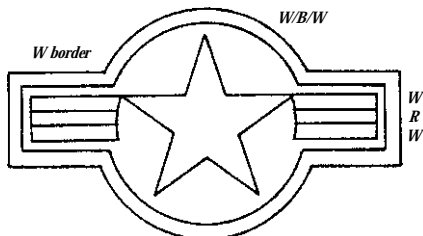
14 January 1947–present (variant).



14 January 1947–present (variant).

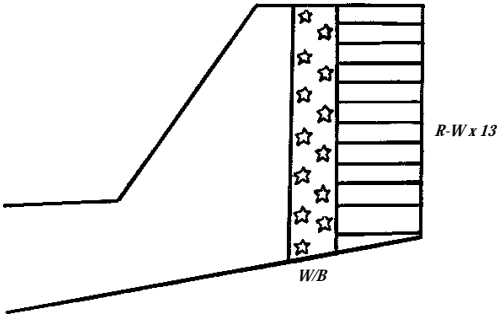


"Arctic Clearance".

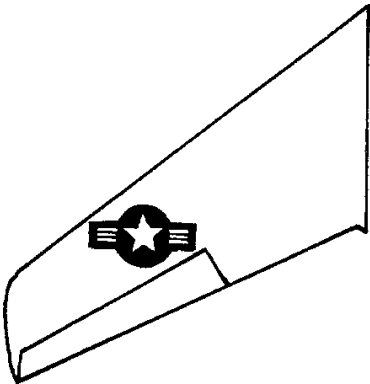


"Clearance" on the US National Air Insignia on the SR-71 "Blackbird".

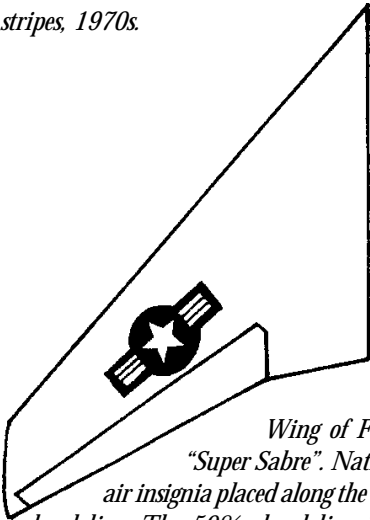
Plate 11: Post-War Emblems



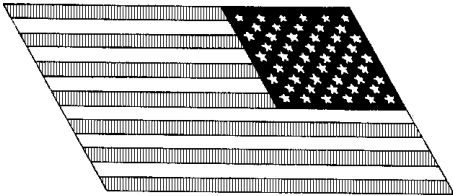
Unofficial tail stripes, 1970s.



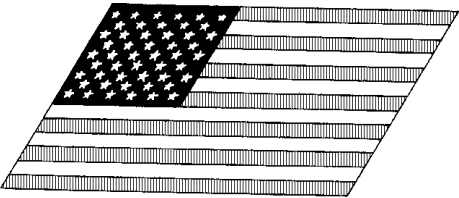
Wing of F-86 "Sabre". National air insignia placed at 90° angle from fuselage centerline.



Wing of F-100 "Super Sabre". National air insignia placed along the 50% chord line. The 50% chord line is the imaginary line formed by the average of the sweep of the wing's leading and trailing edges.



Starboard side of tail.



Port side of tail.

"Raked" flags.

to fame in the skies over Korea. Despite the 35° sweep of the wings, the horizontal axis of the national air insignia remained at 90° from the fuselage (Plate 11).⁸⁶

On 9 March 1955, the air services decreed that the national air insignia be applied along the axis formed by the 50% chord line of the wing (Plate 11),⁸⁷ the imaginary line formed by the average of the sweep of the leading and trailing edges of the wing. The exception to this rule would be on delta-wing fighters, where the national air insignia would be placed near the trailing edge of the wing with the horizontal axis set at 90° from the fuselage centerline.⁸⁸

In the late 1950s an unofficial variant of the insignia appeared on air defense interceptors operating the Arctic. Those aircraft had a bare metal finish accented by bright red tails and wings, a color scheme designed to aid search and rescue efforts in case of an accidental downing. Perhaps to keep the appearance of the insignia clear when placed on the red, a bare metal border was added.⁸⁹ This border is referred to as a “clearance” and is the normal aircraft finish before the application of the Arctic Red (later International Orange) marking. The width of the clearance appears to have been originally set at about double the width of the blue border around the national air insignia. In later years the width was reduced to one inch (Plate 10).⁹⁰ This of course, is not always the case. Some photos of red-marked Navy research aircraft show the national air insignia placed on red backgrounds without a clearance.⁹¹ When only part of the national air insignia is applied to an orange marking, only that part has the clearance.

An unusual use of the clearance was on the all black SR-71 “Blackbird”. Although the clearance is the aircraft finish or color and is used on high-visibility Arctic markings, the SR-71 was painted in an all-black low-visibility scheme. On the Blackbird’s national air insignias the clearance was white and only about one and a half times the width of the blue border of the national air insignia (Plate 10). Because of the nature of the Blackbird’s mission, the national air insignia was not always used—on Air Force and CIA reconnais-

⁸⁶ Robertson, *United States Army and Air Force Fighters*, 213, 219.

⁸⁷ *U.S. Naval Aircraft Markings*, 9.

⁸⁸ Observations from photographs and a variety of actual aircraft.

⁸⁹ Dorr, 113, 114.

⁹⁰ Dana Bell, *USAF Colors and Markings in the 1990s* (London: Greenhill Books, 1992), 45, 54, 56, 58, 67, 69, 73.

⁹¹ Bert Kinzey and Ray Leader, *Colors and Markings of U.S. Navy F-4 Phantoms* (Blue Ridge Summit, Pennsylvania: TAB Books, 1990), 55.

sance missions, no actual national air insignias were displayed.⁹²

The early 1960s saw the return of the U.S. flag as a marking on military aircraft. Its use is usually limited to cargo and VIP transport aircraft and is often placed on the vertical control surface. The flag's proportions vary: some aircraft use the proper 10:19 ratio, on others it is much shorter. On some aircraft the flag marking is rectangular, on others it is rhombus-shaped. With a rhombus shape, the flag appears raked, with the lower point towards the leading edge of the tail surface (Plate 11).⁹³ On some VIP airplanes and helicopters operated by the Army and the Air Force, the flag is the only national insignia displayed.⁹⁴

Possibly the only time that the flag was used as a wing marking on military aircraft was on the planes used by a Navy electronic warfare squadron in Viet Nam. In addition to national air insignia in the standard positions, these aircraft had a large flag painted on the vertical control surface and on the underside of the port wing. Photos do not show if the flag was applied to the starboard upper wing.⁹⁵ The "Golden Falcons" of Helicopter Anti-Submarine Squadron Two (or simply, HS-2) are also authorized to display the flag on their naval aircraft. In addition to the national air insignia they also apply a large U.S. flag on either side of the fuselage. HS-2 is the only anti-submarine helicopter authorized to wear the U.S. flag on its aircraft.⁹⁶

In an interesting aspect of the placement of the national air insignia, on 9 September 1963 the U.S. Army issued instructions to remove the national air insignia from all of its camouflaged aircraft.⁹⁷ Perhaps coincidentally, two months later President John F. Kennedy gave rebel generals in South Viet Nam his promise not to retaliate in the event of a coup. Henry Cabot Lodge,

⁹² Michael O'Leary, *SR-71: Inside Lockheed's Blackbird* (Osceola, Wisconsin: Motorbooks, 1991), photos throughout the book. Measurements of the clearance are based on photos of the national air insignias painted on the aircraft in the book.

⁹³ Various sources.

⁹⁴ Wayne Mutza, *Fighting Colors: UH-1 Huey in Color* (Carrollton, Texas: Squadron/Signal, 1992), 17, 20 and Chuck Stewart, *Superbase 3: Ramstein – Headquarters of the USAFE* (London: Osprey, 1988), 20-25.

⁹⁵ Davis, 43.

⁹⁶ Al Adcock, *H-3 SeaKing in Action* (Carrollton, Texas: Squadron/Signal, 1995), p. 47.

⁹⁷ After the order to remove the national air insignia was released, the Army issued a document explaining those changes. Unfortunately, the museum does not have a copy of that document. Regina G. Burns, Librarian, U.S. Army Aviation Museum. Letter to the author, 13 May 1996.

U.S. Ambassador to the Republic of Viet Nam, told the President "...the ground in which the coup seed grew into a robust plant was prepared by us, and that coup would not have happened (as) it did without our preparation".⁹⁸ This, of course, is not conclusive evidence that the coup of 1963 was the reason for the removal of the national air insignia from camouflaged U.S. Army aircraft. This order affected Army aviation worldwide and is still in effect today. If the coup were the reason, the order might have been confined to aircraft in South East Asia, and Air Force, Navy, and Marine Corps aircraft would have removed their national insignias as well. Instead, throughout most of the war the other air services continued to use full-color national air insignias on their camouflaged aircraft.

The real reason for the U.S. Army's decision to remove the national air insignia from camouflaged aircraft might have been the change in its war-fighting doctrine. As military theory evolved in the nuclear age, "counterinsurgency" (also referred to as "COIN") became the U.S. response to the Soviet doctrine of promoting "wars of national liberation".⁹⁹ The stage was set for the two superpowers to fight the Cold War through surrogates, testing weapons and tactics without actually engaging one another—and unmarked or "sterile" U.S. Army aircraft and their aircrews could go anywhere in the world and conduct operations against a Soviet-trained adversary.

The U.S. Air Force took a different approach. During *Operation Farm Gate* (November 1961–May 1964), the U.S. Air Force was sent to Viet Nam to provide aircraft and training for the Vietnamese Air Force (VNAF). The VNAF discarded its old roundel and adopted a variant of the U.S. national air insignia, a blue roundel charged with a white star. On each side were golden yellow bars with a red horizontal stripe, echoing the flag of the Republic of Viet Nam. A red border (Plate 12) surrounded the whole.

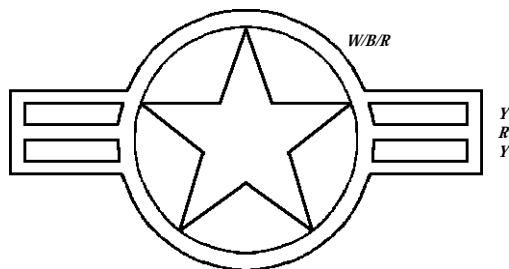
During these operations, USAF aircraft bore the VNAF insignia and had at least one Vietnamese observer aboard. This eventually became a mere formality—often the "observer" was just an unfortunate Vietnamese enlisted man, abducted, thrown into a seat, and told not to touch anything. This was done so that if an American plane were shot down, an Asian body would be found in the wreckage.¹⁰⁰ Eventually, American aircraft began operating against the

⁹⁸ Colonel Harry G. Summers, Jr., *Vietnam War Almanac* (New York: Facts on File, 1985), 141.

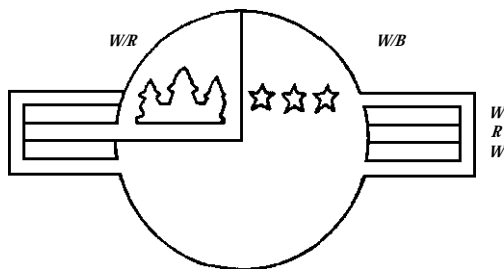
⁹⁹ *Ibid.*, 134.

¹⁰⁰ Jim Mesko, *VNAF – South Vietnamese Air Force: 1945-1975*. (Carrollton, Texas: Squadron/Signal, 1987), 20-23.

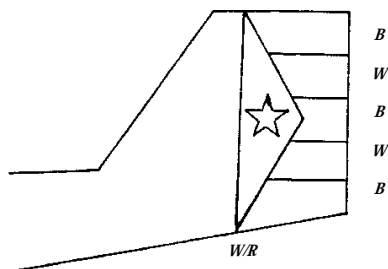
Plate 12: U.S.-Backed National Aircraft Insignia



(South) Viet Nam Air Force national air insignia.

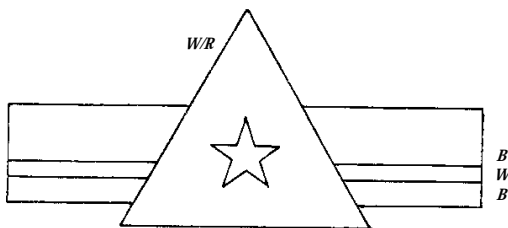


Khmer Republic national air insignia.

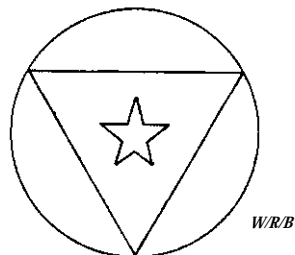


*Both used the same
rudder stripes.*

Cuban FAR national markings.



U.S.-backed Cuban rebels.



Cuban government emblem.

Viet Cong (VC) without even the formality of having a Vietnamese serviceman aboard. Their American pilots were operating under false colors.¹⁰¹ The distinguishing feature of the VNAF-marked American aircraft was the lack of the VNAF fin flash. This marking was the flag of the Republic of Viet Nam in various proportions. American aircraft also appear to have lacked VNAF air insignia on the wings.¹⁰²

The same practice may have occurred in Cambodia. Because the North Vietnamese Army (NVA) and the VC operated out of bases in neutral Cambodia, the U.S. began a secret bombing campaign to disrupt the Ho Chi Minh Trail. In 1970, Prince Norodom Sihanouk was deposed from the Cambodian throne and replaced by General Lon Nol. After this, the U.S. began pouring military aid and training into the new Khmer Republic. Along with a flag change, the Khmer Air Force (KAF) adopted a new national air insignia, a roundel containing elements of the Khmer flag and adding the American wings (Plate 12).¹⁰³ FANK (Forces Armées Nationales Khmer) Training Command was established to train the Khmer armed forces.¹⁰⁴ While training Khmer pilots, American pilots may have flown "training" missions against the VC and the NVA while flying under KAF colors.

Since the early 1960s the U.S. was also covertly involved in Laos, providing training to the regime and conducting air operations from bases in several locations. American aircraft also flew under a variety of markings. The CIA operated an "airline" called *Air America*. Using civil markings and registration, this airline conducted airdrops of troops and supplies in support of the Laotian government. In some cases *Air America* used unmarked all black or olive drab aircraft to conduct secret operations. The U.S. Army attaché in Laos also operated aircraft without national air insignias. Selected aircrews of the U.S. Air Force Attaché's Office flew many "weather reconnaissance" missions over Laos. Although their T-28 aircraft were owned by the Royal Laotian Air Force (RLAF), placards bearing small versions of the U.S. national air insignia were placed on the sides of each plane. Despite the small fuselage insignia (the roundel portion being no larger than a man's hand), they likely still retained the RLAF wing roundels.¹⁰⁵ Other aircraft operating against the

¹⁰¹ "B-26", *Weekday Wings*. Aviation documentary series aired on the Discovery Channel.

¹⁰² Mesko, 20-23.

¹⁰³ Davis, 45.

¹⁰⁴ Summers, 104.

¹⁰⁵ Kenneth Conboy, *War in Laos: 1954-1975* (Carrollton, Texas: Squadron/Signal, 1994), text and photos throughout the book.

NVA and the VC from bases in Viet Nam, Thailand, and aircraft carriers used the U.S. national air insignia.

While U.S. involvement in Southeast Asia became the defining political event of the modern era, it could just as easily have been Cuba. After Fidel Castro turned Cuba into a Communist state, the U.S. acted to counter that nation's revolution. Beginning on 29 November 1959, the U.S. flew unmarked aircraft over Havana to drop propaganda leaflets. In January of 1960 the CIA began to organize an army, navy, and air force to help anti-Castro Cuban exiles mount an invasion of Cuba. At first Cuban pilots were trained using a variety of unmarked aircraft. For the actual invasion they were to bear a fraudulent Cuban national air insignia. The emblem of the Cuban Revolutionary Air Force (FAR) was, as it is today, a blue roundel charged with a red equilateral triangle and white star. The CIA-backed rebels would use an insignia based on the U.S. national air insignia and the Cuban flag. This rebel air force (also known as the FAR) used a red equilateral triangle with a white star and blue and white horizontal bars. To confuse matters further, both FARs used the same rudder markings, painted like the Cuban flag (Plate 12).¹⁰⁶

The "Bay of Pigs" operation, although approved by the Eisenhower administration, was carried out under President John F. Kennedy. Concerned about overt U.S. participation in the invasion, he ordered U.S. Air Force and Navy aircraft assigned to the invasion to remove their national insignias. At the last minute U.S. air support was denied and the rebel FAR suffered terrible losses. When Cuban aircrews refused to fly without American air support, American volunteers flew planes with rebel FAR insignias. In the end, the mission failed because the promised U.S. air support never materialized and the people of Cuba continued to back Castro.¹⁰⁷

During the Reagan administration, the U.S. Air Force conducted a variety of missions in Nicaragua, and the U.S. Army flew many missions in unmarked aircraft. The CIA also operated unmarked aircraft in support of the *contrarevolucionarios* ("Contras").¹⁰⁸ Covert air missions may also have been flown in unmarked or falsely marked aircraft in other parts of the world. CIA aircraft are sometimes seen at U.S. airbases worldwide. Their main distinguishing feature is the lack of markings: other than a splash of color, they usually carry an untraceable serial number.¹⁰⁹

¹⁰⁶ Barry C. Wheeler, *Military Aircraft Markings and Profiles* (New York: Gallery Books, 1990), 110, 115.

¹⁰⁷ Victor Flinham, *Air Wars and Aircraft: A Detailed Record of Air Combat – 1945 to the Present* (New York: Facts on File, 1990), 345-349.

¹⁰⁸ *Ibid.*, 361-365.

¹⁰⁹ Stewart, 44-45.

Subdued Insignia

The war in Viet Nam was a long, frustrating affair, not only for the American people but for the armed forces as well. The war produced a number of innovative military ideas, and in some cases revived and developed old ideas such as the subdued national insignia of World War II. For example, because helicopters operating near the ground were especially susceptible to enemy ground fire, the Marines overspread the white in the national insignia with the same olive drab as the helicopter camouflage.¹¹⁰ Except for the rescue and warning markings, all other markings—including the national air insignia—were painted black (Plate 13),¹¹¹ which would, in theory, reduce the visibility of helicopters approaching a “hot” landing zone.

The Air Force had a different solution: the full-color national air insignia was retained, but reduced from 30 inches high to 15 inches with the blue border deleted (Plate 13). These changes responded in part to the increased sophistication of the optical seekers on anti-aircraft missiles.¹¹² After Viet Nam, the armed forces continued to experiment with low-visibility (“lo viz”) markings, using a number of official and unofficial variants.

In addition to the “borderless” insignia and the Marine variant (the “solid”), two other variants were developed: the “outline” and the “stencil” (Plate 14) versions. The outline is commonly used on fighters and attack planes. The stencil is used mostly by the Air Mobility Command (AMC), the Air Force Reserve (AFREES), and the Air National Guard (ANG).¹¹³

The solid version of the “lo viz” national air insignia has the greatest color variation. The most common colors used on U.S. combat aircraft are black on olive drab, gray on olive drab, olive drab on gray, dark gray on light gray, light gray on dark gray, light gray on pale gray, and light gray on black. On some naval combat aircraft the national air insignia is applied so lightly that it is barely distinguishable from the background color.¹¹⁴ On “Aggressor” aircraft, which are painted in Soviet-style desert camouflage, the solid national air insignia colors are light brown on green, light brown on dark brown, and dark brown on light brown.¹¹⁵ “Stealth” aircraft use two different versions of

¹¹⁰ Mutza, 6.

¹¹¹ Wheeler, 168.

¹¹² Rhodes, 83.

¹¹³ Yenne, 253.

¹¹⁴ Author's observations

¹¹⁵ Tim Laming, *Fight's On!: Airborne With the Aggressors* (Osceola, Wisconsin: MotorBooks, 1996) and George Hall, *Top Gun: The Navy's Fighter Weapons School* (Novato, California: Presidio Press, 1987), photos throughout both books.

the national air insignia. The F-117 “Nighthawk” (also known as the “Blackjet”) uses the outline version in gray on black. The B-2 “Spirit” stealth bomber uses a gray-on-black solid version.¹¹⁶

During the 1970s, the armed forces ran a series of experiments on the subdued national air insignia. On some tests the blue and red were retained, but the white was not used. In one experiment the blue and red elements were only lightly applied to the camouflage paint scheme. Another version had a gray solid version of the air insignia with dark gray in place of the normally white elements, and applied to a light gray background.¹¹⁷ In 1978 the “S” version of the F-4 fighter was produced with a “lower viz” version of the “borderless” national air insignia. This version was black on a light gray background. The “borderless” horizontal bars required a narrow black outline to keep them distinct (Plate 13).¹¹⁸

When aircraft camouflage consists of two or more colors, the application of the national air insignia can be confusing. An insignia of a solid color is applied to a background of another color. When the background is two or more colors, the insignia is a single color different from the background colors. On two-color “splintered” or “mottled” camouflage, the national air insignia can counterchange the colors (Plate 13). Depending on the paint scheme, an aircraft can have national air insignias of two different colors on different parts of the airframe. For example, an aircraft can have a light gray insignia on a dark gray fuselage, and a dark gray insignia on light gray wings.¹¹⁹

The stencil and outline national air insignia are often placed on single-color backgrounds. For multi-colored schemes, those versions of the insignia are sometimes positioned so that the national air insignia is on a single color. The stencil and outline versions have not been observed to counterchange the aircraft paint scheme. The Air Force tends to use the stencil and outline versions, while the Navy and Marine Corps use the solid version.¹²⁰ (The Army does not use the national air insignia on camouflaged aircraft.) The outline and stencil versions of the national air insignia have a number of variants. An early version of the outline insignia had a solid black star. Other variations

¹¹⁶ Erik Simonson, *This is Stealth: The F-117 and B-2 – In Color* (Novato, California: Presidio Press, 1992), photos throughout. Although the “Nighthawk” has an “F” designation indicating a fighter, it is actually a ground attack aircraft.

¹¹⁷ Wheeler, 157, 179, 187.

¹¹⁸ Larry Davis, *F-4 Phantom II in Action* (Carrollton, Texas: Squadron/Signal, 1984), 54.

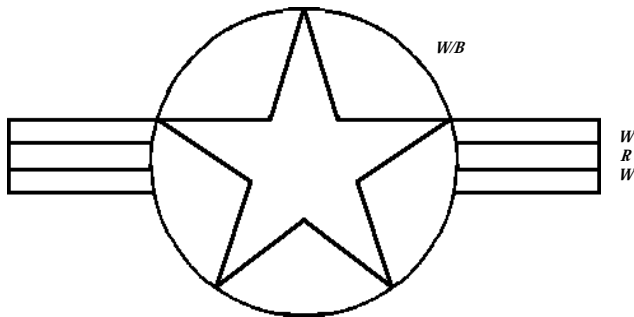
¹¹⁹ Author’s observations from various sources.

¹²⁰ Author’s observations.

Plate 13: Subdued Insignia



Black on olive drab.



Blue border omitted.

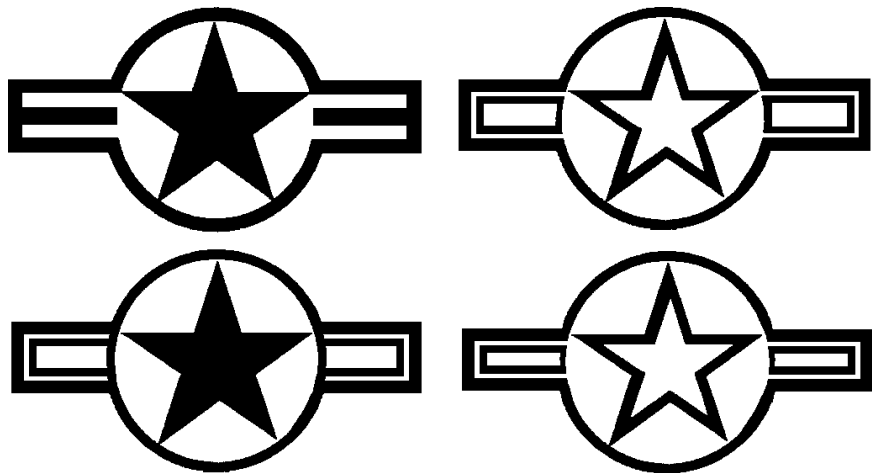


Black on light gray.

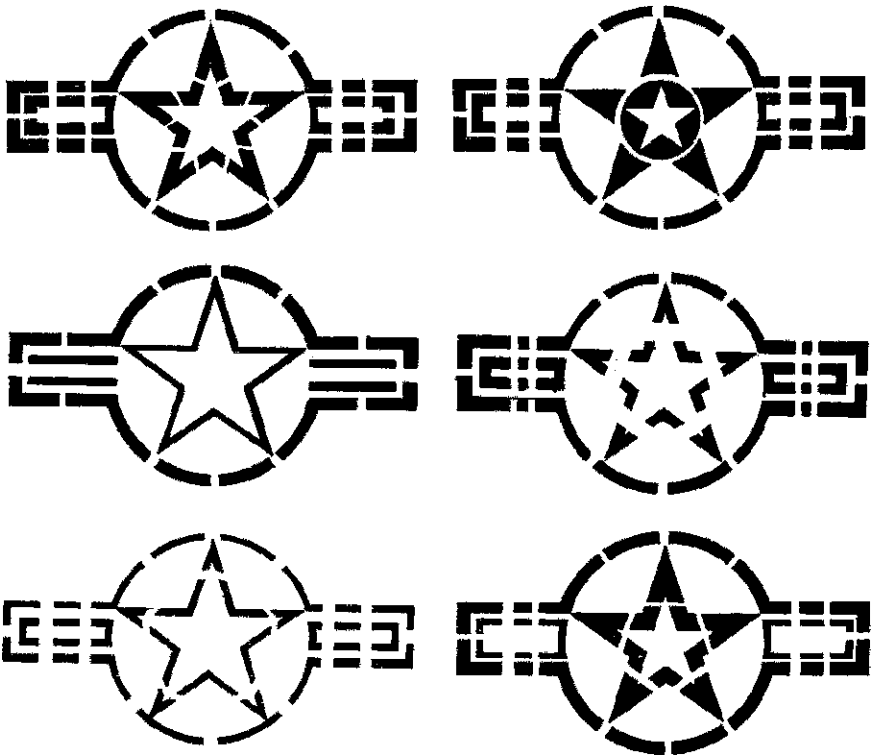


Counter-changed variant.

Plate 14: “Low Viz” Variants



Four “outline” variants, 1970s–present.



Six “stencil” variants, 1970s–present.

may be due to inconsistencies of application. Often, seemingly hastily made stencils produce insignias with poor star or horizontal bar proportions, or an aircraft maintenance technician may produce versions with an added flair.¹²¹

One of the most unusual versions of the national air insignia was on a combat aircraft painted all black for the air-to-air combat sequences used in the motion picture *Top Gun*. After filming was completed, it was restored to its normal camouflage paint scheme. It was later repainted gloss black with a bright-red solid national air insignia. It also has red "Aggressor" stars on the tail fin. This scheme has no training or combat value, but it looks good at air shows.¹²²

Subdued national air insignia are limited to frontline combat, combat support, and "Aggressor" training aircraft painted in camouflage paint schemes. Trainers, hospital planes, VIP transports, and a variety of other aircraft retain full-size and full-color national air insignias. When the aircraft of HS-2 (Helicopter Anti-Submarine Squadron 2) converted from a gloss white to a subdued light gray "lo viz" scheme, the large flags on the fuselage were also subdued. In this case the red and blue elements of the flag were changed to a medium gray and the white stripes and stars became the same pale gray as the aircraft fuselage. The flags themselves do not appear to have been reduced in size.¹²³

Whether or not subdued national air insignia effectively conceal combat aircraft depends on whom you ask. A British camouflage specialist once said, "If I were in charge of tactics, I would spray all fighter aircraft gray, reduce the size of the national insignia and delete *all* unnecessary external colors and markings and that includes all those bright squadron badges!"¹²⁴ Aviation writer Peter R. Foster wrote, "Although many units have opted for outline badges in an attempt to create a complete illusion of low visibility, if your adversary is close enough to see actual unit badges then you are no doubt already dead!"¹²⁵

Realistically, a brightly colored national air insignia can only be seen for a

¹²¹ Various sources.

¹²² Laming, 131.

¹²³ *The Hunt For Red October*, produced by Mace Neufeld/Jerry Sherlock, directed by John McTiernan (Paramount Pictures, 1989, videocassette). Because this film was made with the cooperation of the Department of Defense, unaltered U.S. naval aircraft apparently were depicted, making this a reliable source for the markings of this particular squadron.

¹²⁴ Wheeler, 7.

¹²⁵ Peter R. Foster, *F-15 Eagle* (London: Ian Allen, Ltd., 1990), 55.

few thousand feet (depending on insignia size and colors used). An aircraft can be seen for several miles (this varies with aircraft size, paint scheme, light and weather conditions, and the angle at which aircraft is seen). A jet is usually heard before it is seen. Ground-based and airborne radars can acquire a target over 100 miles away. Infrared optical seekers not only “see” the hot aircraft engine exhaust, but the hot leading edges of the airframe as well (due to friction against the atmosphere).¹²⁶ Satellites can even detect certain types of airfield decoys that may fool high-speed aircraft flying at treetop level.¹²⁷ Aircraft manufacturers have adopted many countermeasures to these threats, such as radar detectors and jammers, infrared decoys, radar-absorbent paint and materials, and low-radar-signature designs. In this never-ending cycle of measure and countermeasure, the national air insignia has been reduced in size and faded; *esprit de corps* has taken a back seat to survivability.

Occasions and Incidents

During the 1976 bicentennial of the Declaration of Independence, some aircraft were temporarily painted in special schemes of special red, white, and blue, which made great public relations tools for the air services. In the most extreme cases, where the entire aircraft was painted in patriotic colors, the national air insignia was usually deleted (perhaps on aircraft covered with stars and stripes, the national air insignia was considered superfluous).¹²⁸

The U.S. armed forces operate two aerial demonstration teams, the Air Force’s Thunderbirds and the Navy’s Blue Angels. Only the Thunderbirds display the national air insignia. Because of their aircraft’s special paint scheme, it is placed on both sides of the fuselage and on the upper left wing.¹²⁹ The Blue Angels identify their nationality by displaying “U.S. NAVY” in large golden yellow letters on their bright blue wings and fuselage (Plate 15).¹³⁰

When a squadron of the Hawaii Air National Guard converted from one paint scheme to another, several of its F-4C “Phantom” fighters ended up with two national air insignias on the fuselage. One scheme called for the national air insignia to be placed near the center of the fuselage while the

¹²⁶ Bill Gunston and Mike Spick, *Modern Air Combat: The Aircraft, Tactics and Weapons Employed in Aerial Warfare Today* (New York: Crescent Books, 1983), 39-65.

¹²⁷ Stewart, 14.

¹²⁸ Dorr, 95, 106, 110, and other sources.

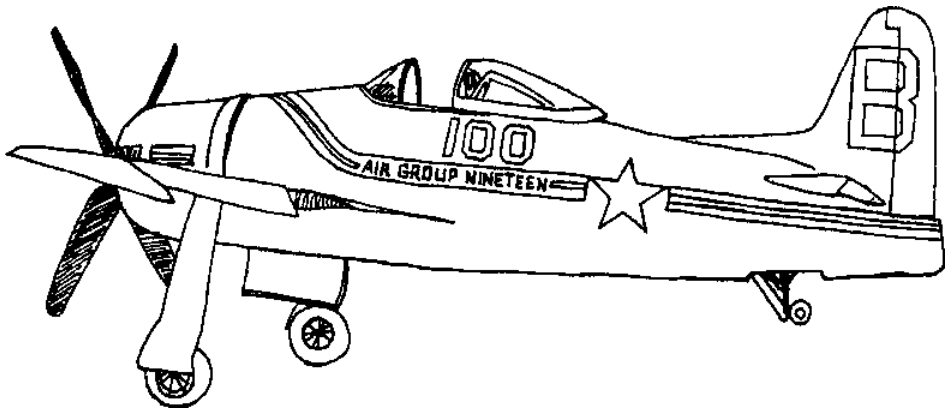
¹²⁹ Bill Siuru and Bill Holder, *F-16 Fighting Falcon* (Blue Ridge Summit, Pennsylvania: TAB/Aero Books, 1991), 67-68.

¹³⁰ Kinzey and Leader.

Plate 15: Distinctive Aircraft Markings



U.S. Navy “Blue Angels” marking.



Personal aircraft of Commander H. E. Cook, Jr., CAG of Air Group 19. Aircraft is a dark blue F8F-1 “Bearcat” fighter.

other required it near the rear. Because of a shortage of gray paint, the extra national air insignia could not be removed. Those aircraft remained with those markings for several weeks.¹³¹ Regulations call for only one national air insignia on each side of the fuselage.¹³²

It is easy to spot the personal aircraft of a Navy carrier air wing commander. Known as the "Commander, Air Group" (or CAG), his aircraft is numbered "000", has a number of brightly colored markings, and its national air insignia is usually larger than on other planes.¹³³ The most outstanding example of this was the personal aircraft of Commander H. E. Cook, Jr., CAG of Air Group 19. Flying an overall dark blue F8F-1 "Bearcat" fighter, the national air insignia on his aircraft was without a doubt unique. The white and red horizontal bars stretched from the tail and then swept upwards to meet in front of the cockpit. The red stripe was interrupted by the legend "AIR GROUP NINETEEN" (Plate 15).¹³⁴ This aircraft (or a reasonable facsimile) survives today as a privately owned classic aircraft, but without the legend.¹³⁵

In 1973, during joint exercises with the Royal Navy, a USMC fighter landed on the HMS *Ark Royal*, but was unable to take off and had to stay aboard until repairs could be made. The *Ark Royal* was scheduled to make a port visit to the island of Malta. Because of strained U.S.-Malta relations at the time, the fighter was partially repainted with Royal Navy squadron markings and the U.S. national air insignia was covered with cardboard.¹³⁶

During development of the "Harrier" attack plane, a special squadron known as the "Tripartite Evaluation Squadron" (TES) was formed to fly and evaluate it. Great Britain, West Germany, and the U.S. jointly funded the aircraft, then known as the "Kestrel".¹³⁷ Because of its international nature, the Kestrel bore the unusual TES roundel, which was divided into three sections. The upper third was the RAF roundel, the second third was a roundel in German colors, and the remaining third was light blue with a full-color

¹³¹ Dorr, 28-29.

¹³² Barry C. Wheeler, *An Illustrated Guide to Aircraft Markings* (New York: Prentice Hall Press, 1986), 110.

¹³³ Dorr, 93-104.

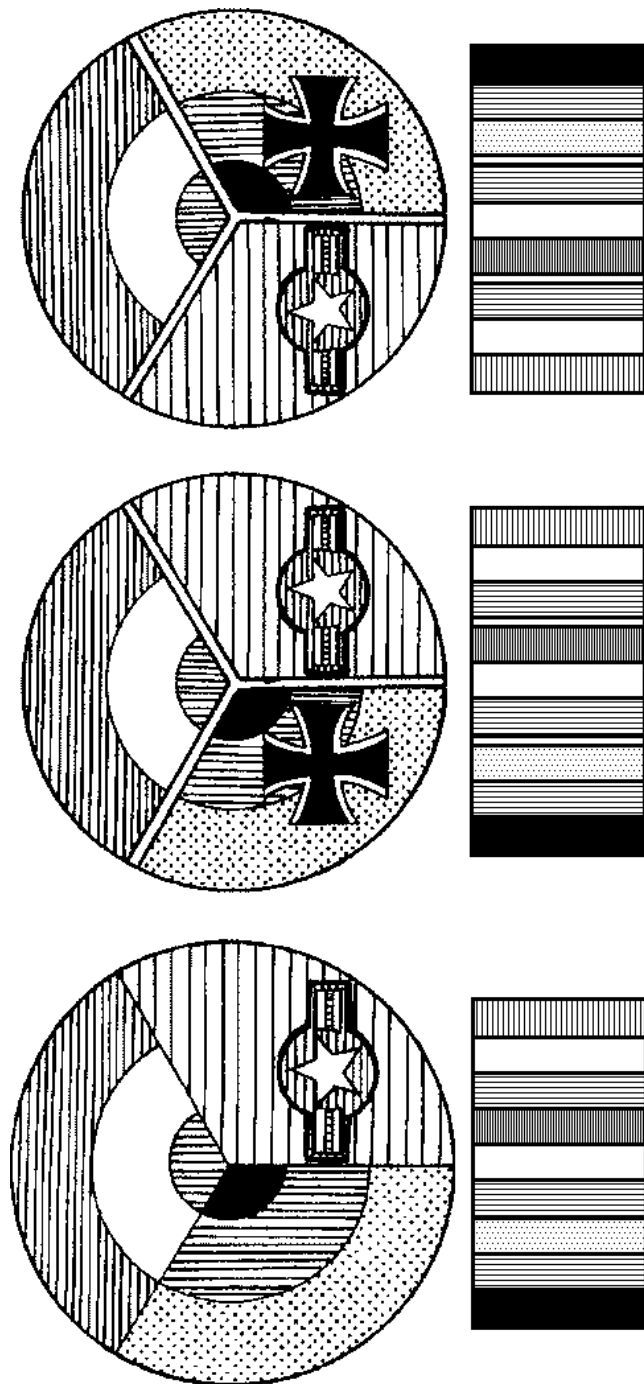
¹³⁴ Edward T. Maloney, *Grumman F8F Bearcat* (Falbrook, California: Aero Publishers, 1969).

¹³⁵ Phillip Makanna, *Ghosts: Vintage Aircraft of World War II* (Charlottesville, Virginia: Thomsson-Grant, 1987), 101-103.

¹³⁶ Dorr, Frontispiece, 4.

¹³⁷ Mike Spick, *BAe/McDD Harrier* (New York: Smithmark, 1991), 13.

Plate 16: Tripartite Evaluation Squadron Markings



Above, roundel; below, fin flash. From left to right, TES insignia as originally specified; TES insignia in actual use, port upper and starboard lower, port fin flash; starboard upper and port lower, starboard fin flash.

U.S. national air insignia centered upon it. The roundel was to be displayed on the upper and lower surfaces of each wing. The fin flash was also international—a horizontal bar divided into nine stripes of black, red, yellow, red, white, blue, red, white, light blue from fore to aft (Plate 116).¹³⁸ On actual TES roundels painted on the Kestrels, a narrow white border separated each segment. The specification chart shows the roundels to be the same on all four wing positions. Photos of Kestrels show that the port and starboard roundels to be mirror images of each other. Additionally, the German *Maltakreuz* defaces the German portion of the roundel. The fin flash on those aircraft also has a narrow white border between the German, British, and American sections (Plate 16).¹³⁹

Just before the 1979 Islamic revolution in Iran, the Imperial Iranian Air Force (IIAF) ordered a number of F-4 Phantom IIs from the McDonnell-Douglas factory in St. Louis, Missouri. The aircraft were painted in Iranian desert camouflage, but had U.S. Air Force serial numbers and U.S. national air insignias. They were ferried to Tehran, Iran by U.S. Air Force pilots. After landing, one of the pilots noticed that the Shah of Iran was being led to a waiting airliner via the rear air stairs. They then realized that the aircraft were being delivered to the wrong regime, but before the pilots could climb back into their aircraft, the U.S. national air insignias had been painted out and replaced with Iranian flags!¹⁴⁰

When flyable enemy aircraft are captured, their markings are quickly removed and replaced with the U.S. national air insignia. Not only does this indicate the aircraft's new owner, when the aircraft is flown for evaluation no one will try to shoot it down. The exception to this rule was on Japanese government aircraft during the American occupation after World War II. General Douglas MacArthur, with a deep understanding of the Japanese people from many years of living and serving in Asia, recommended that Emperor Hirohito be allowed to stay upon the Chrysanthemum Throne. Although the Emperor *reigned*, MacArthur, as head of the Occupation Government *ruled*, and assumed the traditional Japanese role of *shogun* (warlord).

The American *shogun* imposed a new insignia for Japanese government aircraft. Aircraft were to be painted white and had dark green crosses.¹⁴¹ The

¹³⁸ Francis K. Mason, *Harrier*, 2nd ed. (Annapolis, Maryland: Naval Institute Press, 1983), 49.

¹³⁹ *Ibid.*, 52, 54.

¹⁴⁰ Walter J. Boyne, *Phantom in Combat* (Washington, D.C.: Smithsonian Institute, 1985), 161.

¹⁴¹ Robertson, *Aircraft Camouflage and Markings*, 161.

Hinomaru had set—temporarily. A poem may give the only clue to the colors. When Communism began to infiltrate the Tokyo Imperial University, Professor Kiyoshi Hiraizumi established the “Green-Green” School. This philosophy, a revival of traditional Japanese values, derived its name from a poem by a Japanese patriot who fought against the Mongols. Before his execution he wrote, “Evergreen in the snow is even greener”. That is taken to mean that a man under duress who remains green (or true) is truly pure. Perhaps this reflects the words of the Emperor when he announced to the nation his acceptance of the Allied Joint Resolution, asking his nation to “...foster nobility of spirit; and work with resolution so as ye may enhance the innate glory of the Imperial State...”¹⁴²

The Aggressors

Training for modern air combat embodies two philosophies: the Russian maxim—“The harder the training, the easier the war” and the French saying—“The more the things change, the more they stay the same”.

Modern air-to-air combat training began with the dismal fighting record in Viet Nam. During World War II the U.S. Navy’s fighters posted a 15:1 kill ratio over the Japanese. In Korea it is estimated that the kill ratio was as high as 14:1 over Communist fliers. In Viet Nam it fell from 2.5:1 to below 1:1. After studying the problem, the Navy realized that its pilots relied heavily on self-guided missiles and had forgotten the “dog-fighting” tactics first developed in World War I. The Navy’s answer was to establish the Fighter Weapons School (known as “Top Gun”) in 1969. It is a “Ph.D.-level course in air-to-air combat”. Graduates of the course brought the Navy’s kill ratio in Viet Nam up to an acceptable 12:1 margin.¹⁴³

In 1972, the Air Force’s *Red Baron Report* drew the same conclusions as the Navy. The Air Force established its own Fighter Weapons School with the same goal as its Navy counterpart—to train American pilots to fight against an enemy that closely simulates Soviet philosophy, training, weapons, aircraft performance, and tactics. The training is so real that aircraft are painted in

¹⁴² John Toland, *The Rising Sun: The Decline and Fall of the Japanese Empire* (New York: Bantam Books, 1971), 922, 946. Author’s interpretation as to why green was chosen for Japanese government aircraft.

¹⁴³ Hall, 7, 14. As stated, the nuclear age brought about a change in war fighting doctrine. Fighters became seen as rapid weapons-delivery systems capable of bringing a large amount of firepower and even nuclear weapons to the battlefield, making “dogfighting” obsolete.

Soviet camouflage schemes and markings.¹⁴⁴ This is not new. Before World War II, air forces used simulated enemy markings for tactical air exercises. The U.S. used colored squares, crosses, or rings (for simulated enemies designated “red force”, “green force”, etc.),¹⁴⁵ while the German *Luftwaffe* covered its *Maltakreuz* with a red roundel to simulate enemy aircraft.¹⁴⁶

The U.S. Air Force and the U.S. Navy both employ squadrons dedicated to “dissimilar” training. They are known as “Aggressors”. The Air Force and Navy Aggressors generally use either full-color or subdued U.S. national air insignias.¹⁴⁷ In recent years, Aggressors have adopted the national air insignias of potential threat nations. American Aggressor aircraft can be found with the national markings of Iraq, the former Soviet Union, Cuba, and Iran. This usually takes the form of the country’s flag or national air insignia painted on the tail fin. The most common Aggressor marking is the red star, often used as a fin flash with wings and fuselage marked with the U.S. national air insignia. U.S. Marine Corps Aggressors usually deface the red star with the Marine Corps badge in black. Some exceptions to this rule are U.S. Army helicopters marked only with red stars and some U.S. Navy F-14 “Tomcats” painted with the camouflage and national markings of the Islamic Republic of Iran Air Force (IRIAF).¹⁴⁸

Ballistic and Cruise Missiles

Unmanned missiles are a class of munitions, just like bombs, bullets, and hand grenades. While other munitions never carry identifying national markings, some missiles do. Experiments with unmanned flying bombs during and after World War I met with failure and then marginal success, but in World War II the German jet-powered V-1 and the rocket-powered V-2 proved the technology feasible. These early flying bombs carried no national air insignias.¹⁴⁹

Missile technology came to the United States with rocket engineer Werner

¹⁴⁴ Michael Skinner, *Air Combat For the '80s: Red Flag* (Novato, California: Presidio Press, 1984), 23-27.

¹⁴⁵ Archer, 27, 203, 227, 228.

¹⁴⁶ Wheeler, *Military Aircraft Markings and Profiles*, 53.

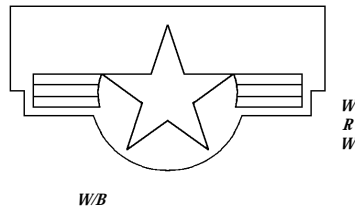
¹⁴⁷ Hall, photos throughout. Skinner, photos throughout.

¹⁴⁸ Laming, photos throughout.

¹⁴⁹ Nigel Macknight, *Tomahawk Cruise Missile* (Osceola, Wisconsin: Motorbooks, 1995), 6-19. Harry G. Stine, *The Making of Weapons that Changed the World* (New York: Orion Books, 1991), photo section.

von Braun and many of his scientists. The U.S. Army also captured a number of V-1s and V-2s. The Army, Navy, and later the Air Force experimented extensively with missiles. In some cases the national air insignia was applied to the missile, on others it was not. As a rule, if the missile had a basic airplane shape, then the air insignia would be applied to the fuselage and wings. Missiles and large rockets with only stubby control fins usually did not have the insignia applied. However, photos show many exceptions.¹⁵⁰

The sea-launched “Regulus 2” cruise missile had another variant of the national air insignia. The missile itself was painted insignia blue on the upper half and white on the lower half. The national air insignia was centered along the division between the colors; the upper half merged into the background and the lower half protruded into the white area¹⁵¹



The practice of applying national air insignia on cruise missiles seems a bit absurd. A frame from a video taken during the Persian Gulf War captures what is presumably an American cruise missile flying at treetop level over Iraq. The frame shows only a dark missile shape flying rapidly by.¹⁵² Without a doubt, if you see a cruise missile flying over your country, its high speed, small size, and low altitude will prevent you from seeing its national air insignia. It’s probably a safe bet that it is an enemy missile and the target is nearby.

Commercial and Private Use

National air insignia serves the same function for aircraft as does a stand of colors for a body of troops or a naval ship: to identify the nationality of a military unit. In theory, the U.S. national flag is protected from commercial use and abuse by Title 36, United States Code, Sec. 176, para. (d). Although the U.S. national air insignia is the air equivalent of the flag, it appears to have

¹⁵⁰ Macknight, photos throughout. Stine, photo section. Apple and Gurney, 143-153.

¹⁵¹ Macknight, 32.

¹⁵² Thomas B. Allen, F. Clifton Berry, and Norman Polmar, *CNN: War in the Gulf* (Atlanta: Turner Publishing, 1991), 167.

no such protection. In fact, the U.S. Air Force Historical Research Agency knows of no prohibition on its use by commercial organizations or private individuals.¹⁵³

This is exemplified by many instances of use observed by the author. For example, a privately owned Ford pickup truck was often seen during the mid-1980s near Kelly AFB, Texas with the national air insignia applied to its white camper shell. Another user of the national air insignia is the company *USA Truck*, based in Van Buren, Arkansas. It operates all-white tractor-trailers emblazoned with the full-color national air insignia over the company name. The complete logo is displayed on the forward portion and on the rear of the trailer and on the cab fairing facing forward.¹⁵⁴ The logo is a registered trademark.¹⁵⁵ These vehicles should not be confused with the white tractor-trailers operated by the U.S. Air Force, which transport intercontinental ballistic missiles (ICBMs). They are marked with the full-color national air insignia and the legend "U.S. AIR FORCE" on each side, and may be the only military land vehicles authorized to bear the national air insignia.¹⁵⁶

Of course, the most common private users are the owners of vintage military aircraft. Many of these aircraft are salvaged airframes that have been meticulously restored, including the authentic markings used during the aircraft's service life. An exception to this rule are some of the aircraft restored aboard the museum ship U.S.S. *Lexington* (ATV-16) moored at Corpus Christi, Texas. At least one "Phantom II" aircraft has a full-color air insignia in the proper positions and proportions except that the blue border is applied to the white bars but not to the roundel portion of the insignia (Plate 17).¹⁵⁷

Even commercial adaptation occurs, such as in the "Ghosts" series of aviation publications. On the 1997 "Ghosts" vintage aircraft calendar, a gold-bordered roundel of 1942-43 (Plate 17) forms the "O" in "GHOSTS".¹⁵⁸ The Houston Aeros hockey club of the International Hockey League uses two ad-

¹⁵³ A. Timothy Warnoch, chief of the Organizational History Branch, Air Force Historical Research Agency, Maxwell AFB, Alabama. Letter to the author, 29 May 1996.

¹⁵⁴ Author's observations.

¹⁵⁵ *The Trademark Register of the United States 1996*, 38th ed. (Washington, D.C.: The Trademark Register, 1996), 1829.

¹⁵⁶ The Progressive Foundation, Inc., *Nuclear Heartland* (McFarland, Wisconsin: Community publications, 1988), 19, 30.

¹⁵⁷ Author's observations aboard that ship.

¹⁵⁸ Jean Makana, ed., *Ghosts 1997: A Time Remembered* (San Francisco, California: Ghosts and Chronicle Books, 1996), 1997 calendar, logo on cover.

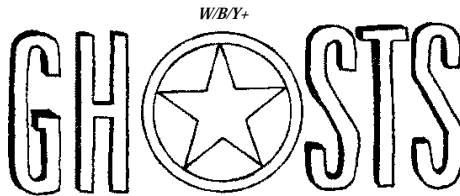
Plate 17: Private Use of the U.S. Air Insignia



Restored "Phantom II" aircraft aboard the U.S.S. Lexington museum ship showing erroneous insignia.



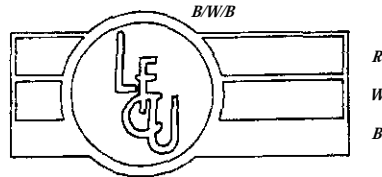
Commercial virtual reality flight simulator aboard the U.S.S. Lexington museum ship showing erroneous insignia.



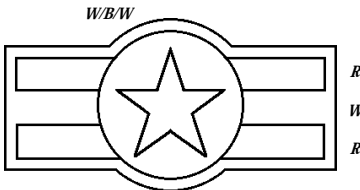
"Ghosts" logo from the 1997 calendar.



Houston Aeros Hockey Club logo.



Lackland Federal Credit Union logo, Lackland AFB, Texas.



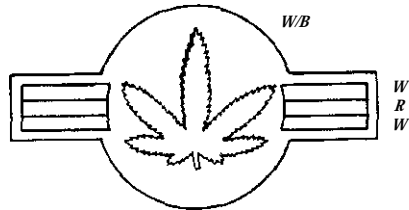
Houston Aeros Hockey Club shoulder patch.



Logo of Alpha Industries, Inc.



Roundel of Fantasy Fighters of Santa Fe, New Mexico.



THC logo from a baseball cap.

aptations of the of the national air insignia. The main logo is composed of a B-17 bomber flying through a hockey puck with "HOUSTON AEROS" just above the puck. The "O" on "AEROS" is the national roundel of 1942-43. The shoulder logo on the game jersey is a variant of the present national air insignia, composed of a blue roundel surcharged with a white five-point star of a smaller diameter. On each side of the roundel are two red horizontal bars with a central white stripe, the whole surrounded by a white border placed on a green background (Plate 17).¹⁵⁹ Aboard the U.S.S. *Lexington* museum ship, three full-color national air insignia variants adorn a commercial virtual reality flight simulator ride. In this case, not only are the star and bar proportions inaccurate, but the bars are composed of three red stripes and two white horizontal stripes (Plate 17).¹⁵⁸ One of the more interesting derivatives of the national air insignia is the logo of Lackland Federal Credit Union, with corporate headquarters located on Lackland AFB, Texas, the site of the U.S. Air Force's largest training center. Its logo is a roundel charged with the initials "LFCU" and exaggerated asymmetrical horizontal bars of red, white, and blue (Plate 17).¹⁶¹

The collapse of the Soviet Union and other Eastern Bloc nations was a blessing to aircraft collectors. Previously unavailable aircraft, along with their authentic markings, are now in the hands of vintage aircraft collectors. Fantasy Fighters of Santa Fe, New Mexico, leases Eastern Bloc aircraft and trains private pilots to earn FAA letters of authorization to fly high-performance jet aircraft. One Fantasy Fighters plane, a Czech-built L-29 "Delfin" (U.S. civil registration N3939L), uses a unique marking based on the national air insignia. It is a white roundel bearing a red hammer and sickle, white horizontal bars with a red central stripe, surrounded by a blue border. Because the aircraft has a blue and white disruptive paint scheme, the insignia has no border on the blue areas and on the white areas the border is added (Plate 17).¹⁶²

The U.S. flag, because of its power and ubiquity, is often the target of ridicule or sarcasm—for example, when the stars on the flag are replaced by skulls or marijuana leaves. In at least one instance the national air insignia is also parodied in this manner. A company known as "THC" produces a line of counter-culture clothing and paraphernalia. Among these items is a baseball

¹⁵⁹ Tim Bryant, ed. *1996-97 International Hockey League Official Guide and Record Book* (Peoria, Illinois: Multi-Ad Services, Inc., 1996), 26, 50, 53.

¹⁶⁰ Author's observations.

¹⁶¹ Author's observations.

¹⁶² Geza Szurovy, "Delfins and MiGs and Yaks, Oh My!", *Private Pilot* (Irvine, California: Fancy Publications), January 1997, Vol. 32, No. 1, 22-29.

cap with the national air insignia on the front. A white marijuana leaf (*Cannabis sativa*) replaces the white star (Plate 17). Stitched on the back of the cap is the slogan "AIM HIGH...THC".¹⁶³ This parodies the U.S. Air Force's recruiting slogan "Aim High...Air Force". THC (delta-9-tetrahydrocannabinol) is the active ingredient in marijuana.

In a final commercial example, the logo of Alpha Industries (a clothing manufacturer) is a stylized letter "A" with three horizontal bars protruding from each side (Plate 17), an obvious intent to emulate the national air insignia.¹⁶⁴

One of the most popular genres of motion pictures is the military film. The cooperation of the armed forces often ensures the use of actual aircraft and their markings. Motion pictures such as *Top Gun* and *The Hunt for Red October* and many others were able to film actual American military aircraft and their markings. However, in some cases the U.S. armed forces, because of a controversial theme, refuse to cooperate with Hollywood. In these films, either through design or oversight, the U.S. national air insignia may be applied out of proper proportion or out of position.

In *Independence Day*, the national air insignia on the virtual and full-size mockup F/A-18 "Hornet" fighters is not painted correctly¹⁶⁵. In *Iron Eagle* and *Iron Eagle II*, not only are the national air insignias the wrong colors on the camouflaged F-16 "Fighting Falcons", but they are placed on the upper and lower surfaces of *both* wings.¹⁶⁶ In *Hotshots*, a parody of *Top Gun*, the national air insignia is placed on the upper and lower surfaces of the right wing only (as opposed to the upper left and lower right) and the insignias are placed at 90° from the fuselage rather than along the 50% chord line.¹⁶⁷

¹⁶³ Author's collection.

¹⁶⁴ Author's observations.

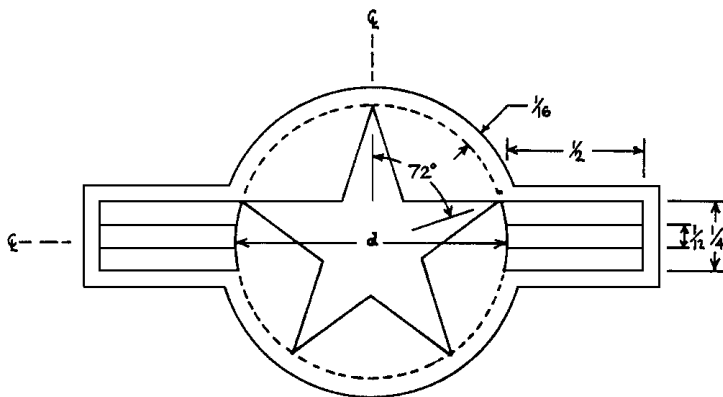
¹⁶⁵ *Independence Day*, produced by Dean Delvin, directed by Roland Emmerich (Twentieth Century Fox, 1996, videocassette).

¹⁶⁶ *Iron Eagle*, produced by Joe Wizan and Ron Samuels, directed by Sidney J. Furie (Tri Star Pictures, 1985, videocassette) and *Iron Eagle II*, produced by Jacob Harel and John Kemeny, directed by Sidney J. Furie (Carolco Pictures, 1988, videocassette). Both films were shot on location in Israel using re-marked Israeli Air Force aircraft.

¹⁶⁷ *Hotshots*, produced by Bill Badalato, directed by Jim Abrams (Twentieth Century Fox, 1991, videocassette).

Specifications

The construction of today's national air insignia is based on the diameter of the roundel portion of the insignia. The diameter is measured in 5-inch (127mm) increments. Construction of the other elements of the insignia is based on fractions of the roundel's diameter.¹⁶⁸



NOTE: DOTTED LINE IS NOT INCLUDED IN DESIGN.

The colors of the insignia are the following:¹⁶⁹

Insignia Red	FS 11105
Insignia White	FS 17875
Insignia Blue	FS 15044

Conclusion

Military aviation, now over 200 years old, developed slowly in its first century, while its second century brought rapid changes in technology. However, the need for a fast and reliable means to identify military aircraft has remained a constant. Cloth flags, initially the most common method on balloons, became obsolete in the transition to airplanes. The national air insignia, never altered in some countries, has evolved in the U.S. with the changing tactical environment from 1861 to today.

¹⁶⁸ Wheeler, *Illustrated Guide to Aircraft Markings*, 110.

¹⁶⁹ Lloyd S. Jones, *U.S. Bombers 1928 to 1980s* (Fallbrook, California: Aero Publishers, 1980), 264.

Acknowledgements

The author would like to thank the following for their assistance in this project:

Staff Sergeant Michael J. Obert, USAF, historian, San Antonio Air Logistics Center, Office of History, Kelly Air Force Base, Texas.

D. Menard, United States Air Force Museum, Wright-Patterson Air Force Base, Ohio.

Regina G. Burns, Librarian, U.S. Army Aviation Museum, Fort Rucker, Alabama

A. Timothy Warnock, Organizational History Branch, Air Force Historical Research Agency, Maxwell Air Force Base, Alabama.

... and Judith I. Gámez, for tolerating a house full of aviation books for extended periods, and for watching countless hours of aviation documentaries.

