Bell P-63 Kingcobra

Bell P-63A Kingcobra soviétique

Le P-39 fut conçu comme intercepteur. Mais la décision de retirer les turbocompresseurs pour des raisons de coût et de complexité fit qu'il ne fut jamais performant à haute altitude. Le XP-39E tentait de résoudre le problème, mais fut décevant. Il intéressait cependant l'USAAF au point qu'elle en commanda une version agrandie le 27 juin 1941, désignée XP-63. Deux prototypes devaient être propulsés par le moteur V-1710-47. Un troisième fut ajouté, avec un moteur Packard V-1650 (Rolls-Royce Merlin construit sous licence aux États-Unis). Son aile fut redessinée et à écoulement laminaire. L'hélice devenait quadripale (bien que certains P-39Q reçurent eux aussi une hélice quadripale). Les panneaux d'accès à l'armement furent agrandis. Surtout, une quille ventrale fut ajoutée en-dessous de la dérive. Dès septembre 1942, l'USAAF ordonna la production en série du P-63A (Bell Model 33) qui reprenait l'armement du P-39Q : un canon M4 de 37 mm tirant à travers le moyeu de l'hélice, et 4 mitrailleuses de 12,7 mm. Le premier prototype effectua son vol inaugural le 7 décembre 1942, mais s'écrasa le 28 janvier 1943. Le deuxième prototype vola le 5 février 1943 et s'écrasa lui aussi. Le troisième prototype fut équipé d'un Allison V-1710-93, qui lui donnait une vitesse de 678 km/h. Désigné XP-63A, il vola le 26 avril 1943. Le P-63A entra en service en octobre 1943, mais l'USAAF le jugea inférieur au P-51. Ses alliés, en particulier l'URSS qui utilisait déjà le P-39, avaient un grand besoin de chasseurs. Il fut donc construit en série pour être vendu dans le cadre de la loi Prêt-Bail. L'URSS envoya un pilote expérimenté, Andrey G. Kochetkov, et un ingénieur, Fyodor P. Suprun chez Bell en février 1944 afin de tester et de participer au développement du P-63. Les tests de mise en vrille alors effectués permirent d'élaborer un avion selon les souhaits des Soviétiques. Des modifications furent également apportées sur l'armement, et le P-63 obtint un taux de roulis de 110°/s, supérieur au P-47 et P-51. Un P-63 fut également essayé avec des skis à ce moment-là, mais sans suite.

Bell P-63 Kingcobra de front

Les deux principales versions construites en série furent le P-63A et le P-63C, en grande partie utilisées par l'URSS. Les USA utilisèrent quant à elle surtout une version drone-cible. L'URSS reçut 2397 (2672, selon certaines sources) P-63, soit les trois quart de la production. Le fuselage et les ailes furent renforcés. Ils furent acheminés de l'usine de Niagara Falls (New York) jusqu'à Nome (Alaska) par les pilotes américains (dont des femmes), puis de là firent la traversée du détroit de Béring et survolèrent l'Alaska. Des femmes pilotes russes participèrent à l'acheminement. Les sources officielles soviétiques tendent à minorer l'apport des appareils anglo-saxons. Mais nous savons que le P-63 fut considéré comme un excellent avion d'attaque au sol. Il entra secrètement en service, et aurait été déployé pour la première fois lors de l'attaque contre Konigsberg, puis en Pologne et lors de la bataille de Berlin. Les Allemands ont rapportés avoir abattus des P-63. Mais les P-63 furent également employés au combat aérien, descendant des bombardiers tels que des Ju-87, ainsi que des chasseurs. Au 9 mai 1945, 1148 KingCobra étaient en service. Les P-63 soviétiques furent également engagés lorsque l'URSS envahit le Mandchoukouo et la Corée du Nord. La première victoire officielle, contre un Ki-43, date du 15 août 1945. Le P-63 fut utilisé bien après la guerre et reçut le nom de code Fred. Le 8 octobre 1950, deux F-80C attaquèrent par erreur un terrain d'aviation soviétique et endommagèrent 12 P-63. L'armée de l'air reçut 114 P-63C (la plupart des sources disent même 300), trop tard pour être engagés lors de la Seconde guerre mondiale. Ils furent déployés lors de la guerre d'Indochine par le Normandie-Niemen, avant d'être retirés du service en 1951 à cause des pertes et du manque de pièces détachées et remplacés par le F8F Bearcat. Le Honduras reçut également 5 P-63E après la guerre (utilisés de 1948 à 1960). Dans l'immédiat après-guerre, les surplus américains furent vendus afin de participer à des courses. 3303 exemplaires furent construits jusqu'en 1945. Il en existe 11 survivants (1 P-63E au Honduras, 1 P-63C en Russie, et 6 en état de vol).

Source : https://aviationsmilitaires.net/v3/kb/aircraft/show/611/bell-p-63-kingcobra-otan-fred

Version anglaise Wikipédia

The **Bell P-63 Kingcobra** is an American fighter aircraft that was developed by Bell Aircraft during World War II. Based on the preceding Bell P-39 Airacobra, the P-63's design incorporated suggestions from P-39 pilots and was superior to its predecessor in virtually all respects. The P-63 was not accepted for combat use by the United States Army Air Forces. However, it was used during World War II by the Soviet Air Force,[1] which had also been the most prolific user of the P-39.

Design and development

XP-39E

While the P-39 had been introduced as an interceptor, later in its development it was decided to reduce the cost and complexity of the engine by removing the turbocharger. High-altitude performance suffered dramatically as a result, and Bell proposed an experimental series to test out a variety of solutions. The resulting **XP-39E** featured two primary changes from the earlier P-39D from which it was developed. One was a redesigned wing. The root airfoil, a NACA 0015 on other models of the P-39, was changed to a NACA 0018, to gain internal volume.[2] The other was a switch to the Continental I-1430 engine, which featured an improved overall design developed from the hyper engine efforts, as well as an improved supercharger. Three prototypes were ordered in April 1941 with serials 41-19501, 41-19502 and 42-7164. The I-1430 had continued development problems and could not be delivered in time, so it was replaced by an Allison V-1710-47, similar to that powering the P-39. Each prototype tested different wing and tail configurations: 41-19501 had a rounded vertical tail, but squared-off tailplane tips; 41-19502, a squared-off fin and rudder and large wing fillets; and 42-7164 had all its flight surfaces squared off. The XP-39E proved faster than standard Airacobra, reaching a maximum speed of 386 mph (621 km/h) at 21,680 ft (6,610 m) during tests. However, the XP-39E was considered inferior to the stock P-39 Airacobra in all other respects, so it was not ordered into production.

XP-63

Bell assembly line near Niagara Falls, New York

Although the XP-39E proved disappointing, the USAAF was nevertheless interested in an even larger aircraft based on the same basic layout. Even before its first flight, the USAAF placed an order on 27 June 1941 for two prototypes of an enlarged version powered by the same V-1710-47. The new design was given the designation **XP-63** and serials were 41-19511 and 41-19512. A third prototype was also ordered, 42-78015, using the Packard V-1650, the U.S.-built version of the Rolls-Royce Merlin engine. The XP-63 was larger in all dimensions than the Airacobra. The wing was redesigned again, this time with new NACA laminar flow airfoils, 66(215)-116 a=0.6 at the root and a NACA 66(215)-216 a=0.6 at the tip. The wing taper ratio was approximately 2:1, span was 38 ft 4 in (11.68 m), and wing area was 248 sq ft (23.0 m^2).[3] The engine was fitted with a second remotely mounted supercharger, supplementing the normal single-stage supercharger. At higher altitudes, when additional boost was required, a hydraulic clutch would engage the second supercharger, adding 10,000 ft (3,000 m) to the service ceiling. A larger four-bladed propeller was also standardized. A persistent complaint about the Airacobra was that its nose armament was not easily accessible for ground maintenance; to cure this problem the XP-63 airframe was fitted with larger cowling panels. In September 1942, even before the prototype flew, the USAAF ordered it into production as the **P-63A** (Model 33).[4] The P-63A's armament was to be the same as the current P-39Q, a single 37 mm (1.46 in) M4 cannon firing through the propeller hub, two synchronized .50 in (12.7 mm) machine guns in the cowl, and two .50 in (12.7 mm) machine guns in underwing gondolas. The first prototype, 41-19511, flew for the first time on 7 December 1942. It was destroyed on 28 January 1943 when its landing gear failed to extend. The second prototype, 41-19512, followed on 5 February 1943. It, too, was destroyed, this time due to an engine failure. The Merlin-engined 42-78015 (as Merlins were primarily needed for the P-51 Mustang) was delivered with another Allison instead, a -93, which had a war emergency rating of 1,500 hp (1,100 kW) at sea level, making this prototype one of the fastest Kingcobras built, attaining 421 mph (678 km/h) at 24,100 ft (7,300 m).

First production P-59A with a P-63 behind.

Deliveries of production P-63As began in October 1943. The USAAF concluded the Kingcobra was inferior to the Mustang, and declined to order larger quantities. American allies, particularly the Soviet Union, had a great need for fighter aircraft, however, and the Soviets were already the largest users of the Airacobra. Therefore, the Kingcobra was ordered into production to be delivered under Lend-Lease. In February 1944, the Soviet government sent a highly experienced test pilot, Andrey G. Kochetkov, and an aviation engineer, Fyodor P. Suprun, to the Bell factories to participate in the development of the first production variant, the P-63A. Initially ignored by Bell engineers, Kochetkov's expert testing of the machine's spin characteristics (which led to airframe buckling) eventually led to a significant Soviet role in the development.

After flat spin recovery proved impossible, and upon Kochetkov's making a final recommendation that pilots should bail out upon entering such a spin, he received a commendation from the Irving Parachute Company. The Kingcobra's maximum aft CG was moved forward to facilitate recovery from spins.[5] P-63A-8, SN *269261*, was extensively tested at TsAGI in what was then the world's largest wind tunnel. Soviet input was significant. With the Soviet Union being the largest buyer of the aircraft, Bell was quick to implement their suggestions. Most of the changes in the A sub-variants were a direct result of Soviet input, e.g. increased pilot armor and fuselage hardpoint on the A-5, underwing hardpoints and extra fuel tanks on the A-6, etc. The Soviet Union even experimented with ski landing gear for the P-63A-6, but this never reached production. Most significantly, Soviet input resulted in moving the main cannon forward, favorably changing the center of gravity, and increasing its ammunition load from 30 to 58 rounds for the A-9 variant. The P-63 had an impressive roll rate, besting the US P-47, P-40, and P-51—and the Japanese Navy's Kawanishi N1K2 *Shiden-Kai* fighter—with a rate of 110° per second at 275 mph (443 km/h).[6]

Swept-wing L-39

L-39 with swept wings, extended rear fuselage, ventral tail fin and P-39 prop

After the war, two war surplus P-63Cs were modified by Bell under Navy contract for flight testing of low-speed and stall characteristics of high-speed wing designs. The aircraft received new wings with adjustable leading edge slats, trailing edge flaps and a pronounced sweep of 35 degrees. The wings had no wheel wells; only the nose gear was retractable.[7] L-39-1 first flew 23 April 1946, demonstrating a need for extra tail surface and rear fuselage length to balance the aircraft in flight—the wing repositioning reduced empennage effectiveness and moved the center of lift aft. A lighter three-bladed propeller from a P-39Q-10 was mounted and the necessary changes to the empennage were made. L-39-2 incorporated these adjustments from the start. L-39-1 later went to NACA at Langley for wind tunnel testing, where much valuable data was gathered.[8] L-39-2 also served as a testbed for the Bell X-2 40-degree wing design.[9]

Operational service

Soviet Union

The first version to be supplied in quantity to the Soviet Union was the P-63A-7 with a higher vertical tail, and reinforced wings and fuselage. The fuselage proved to need strengthening; consequently, in October 1944 a reinforcement kit for operational P-63s was developed.[10] Air Transport Command ferry pilots, including U.S. women pilots of the WASP program, picked up the planes at the Bell factory at Niagara Falls, New York, and flew them to Great Falls, Montana and then onward via the Northwest Staging Route through Canada to Alaska, where Soviet ferry pilots, many of them also women, would take delivery of the aircraft at Nome[11] and fly them to the Soviet Union over the Bering Strait via the Alaska-Siberia route (ALSIB). A total of 2,397 (2,672, according to other sources)[12] aircraft were delivered to the USSR, 72.6% of the overall 3,303 production aircraft.[13] By a 1943 agreement, P-63s were not allowed for Soviet use against Germany and were supposed to be concentrated in the Soviet Far East for an eventual attack on Japan However, there are many unconfirmed reports from both Soviet and German sources that P-63s did indeed see service against the *Luftwaffe*. In memoirs published in the 1990s, one of Pokryshkin's pilots reported that the entire 4th Guards Fighter Aviation Regiment (4 GvIAP) was secretly converted to P-63s in 1944, while officially still flying P-39s. One account states they were in action at Königsberg, in Poland and in the final assault on Berlin. There are German reports of P-63s shot down by both fighters and flak. Hans Rudel, the most-decorated pilot of the Luftwaffe, states in his memoirs, "We often encounter American types of aircraft, especially Airacobras, Kingcobras and Bostons." This was in the Courland front towards the end of the war.[14] Nevertheless, all Soviet records show nothing but P-39s used against GermanyIn general, official Soviet histories played down the role of Lend-Lease supplied aircraft in favor of local designs, but it is known that the P-63 was a successful fighter aircraft in Soviet service. A common Western misconception is that the Bell fighters were used as ground attack aircraft. One of the enduring myths regarding the P-39/P-63 in Soviet use is that because of its armament, in particular the 37mm nose cannon, it excelled as a ground-attack aircraft, even a 'tank buster'. In translating and preparing this manuscript for publication, I have had the opportunity to peruse several Russian-language sources. Mentions of the employment of this aircraft in the ground-attack role are so rare in these sources as to be exceptional ... The 'tank buster' myth has its roots in the misunderstanding of the general wartime role of the Red Air Force and in the imprecise translation of specific Russian-Language terms that describe this role. The specific Russian-Language term most often used to describe the mission and role of the Airacobra-equipped Red Air Force fighter units, in this manuscript and other Russian-language sources, is *prikrytiye sukhoputnykh voysk* [coverage of ground forces]... Frequent misunderstanding in this country as to the combat role of the P-39 in Soviet use is based in part on imprecise translation of the term *prikrytiye sukhoputnykh voysk* to 'ground support'. The latter term as it is understood by many Western military historians and readers, suggests the attacking of ground targets in support of ground troops, also called 'close air support'. Did a Soviet Airacobra pilot ever strafe a German tank? Undoubtedly. But this was never a primary mission or strong suit for this aircraft.

—*Soviet Army Colonel Dmitry Loza, Commanding the Red Army's Sherman Tanks: The World War II Memoirs of Hero of the Soviet Union, Dmitriy Loza, Loza and Gebhardt 2002, pp. 15–16.*

The Soviets developed successful group aerial fighting tactics for the Bell fighters and scored a surprising number of aerial victories over a variety of German aircraft. Low ceilings, short missions, good radios, a sealed and warm cockpit and ruggedness contributed to their effectiveness. To pilots who had once flown the tricky Polikarpov I-16, the aerodynamic quirks of the mid-engined aircraft were unimportant. In the Far East, P-63 and P-39 aircraft were used in the Soviet invasion of Manchukuo and northern Korea. In the Pacific theatre, the Kingcobras flew escort, close air support and ground attack missions. The Soviet P-63s achieved their first air victory on 15 August 1945, when *Lejtenant* I. F. Miroshnichenko from 17th IAP/190 IAD, shot down a Nakajima Ki-43 *Hayabusa* IJAAS fighter off the coast of North Korea.[12] Sufficient aircraft continued in use after the war for them to be given the NATO reporting name of **Fred**. By 9 May 1945, operational units still had 1,148 Kingcobras on strength.[12] On 8 October 1950, two USAF F-80Cs from the 49th Fighter Group breached the USSR's border and attacked Sukhaya Rechka airfield 19 mi (31 km) south-west of Vladivostok and 62 mi (100 km) from the Soviet-Korean border,[15] making two strafing runs before returning to their home base.

Soviet sources say the attack was intentional, but the pilots claimed it was a result of a navigational error.[16] The airfield belonged to the Air Forces of the Pacific Fleet (VVS TOF), but it was occupied by the 821st Fighter Aviation Regiment (821 IAP) of the 190th Fighter Aviation Division (190 IAD). Mostly aircraft of the 1st Squadron of 821 IAP were hit with 12 P-63s damaged, one P-63 burned to the ground while the other damaged aircraft were able to be repaired. There were no human losses.[17]

France

In 1945, 114 later models were delivered to the French Air Force (*Armée de l'Air*), but they arrived too late to see service in World War II. They did see service during the First Indochina War before being replaced in 1951. Initially, the French Kingcobras were deployed to Algeria. Fighter squadron (Groupe de Chasse) 2/6 "Travail", previously equipped with P-39 Airacobras, received their Kingcobras on 18 July at Casablanca; the pilots were surprised by the higher landing speed of their new aircraft.[18] The Kingcobra were scrambled to Indochina when the insurgency broke. Only 60 Kingcobras were operational in Indochina in January 1950, mainly because the Americans refused to supply spare parts.[19] Starting in February 1951, the squadrons equipped with Kingcobra started to receive Grumman F8F Bearcats as replacements. Most Kingcobras were mothballed by July. The last flight of a Kingcobra in Indochina took place on 6 September 1951.[20]

"Pinball" operations

Its main use in American service was the unusual one of a manned flying target for gunnery practice.[21] The aircraft was generally painted bright orange to increase its visibility. All armament and the regular armor was removed from these RP-63 aircraft, and over a ton of armored sheet metal was applied to the aircraft. This was fitted with sensors that would detect hits, and these hits were signaled by illuminating a light in the propeller hub where the cannon would have been. This earned the aircraft the unofficial nickname of *Pinball*.[21] Special frangible rounds made of a lead/Bakelite combination were developed that would disintegrate upon impact.[21] These were known as the "Cartridge, Caliber .30, Frangible, Ball, M22". In 1990, veteran Pinball pilot, Ivan L. Hickman, wrote *Operation Pinball* about the training flights.[22]

RAE Testing

British engineers, like the Americans, had a growing interest during World War II in the application of laminar flow airfoils. In an effort to learn more about the practical application of laminar flow airfoils, in 1945 the Royal Aircraft Establishment (RAE) undertook a flight test program with one of the two P-63As that the United Kingdom had received.[23] The aircraft was equipped with a wake rake array mounted outboard, behind the wing, to allow the momentum deficit, and thus section drag, to be measured. The RAE first tested it in an "as delivered" configuration. The wing airfoil was designed to support laminar flow to 60% of chord. In the "as delivered" configuration, a profile drag was measured which was representative of the wing section with boundary layer transition at the leading edge (0% laminar flow). Reducing the surface roughness reduced the drag at low lift coefficients to a level representative of laminar flow to 35% of chord.[23] Measurements were made of the surface waviness. This showed peak wave amplitudes, above the mean, of approximately 0.011 inches (0.28 mm) over a two-inch (5.1 cm) span. The standard waviness criteria[24] shows the critical wave height to be 0.0053 inches (0.13 mm) for this application.[25] To reduce the waviness, RAE personnel stripped the wing to bare metal. The wing was then sprayed with two coats of primer paint and a coat of paint type filler. After the paint was dry, it was sanded in a chordwise direction, using sanding blocks whose curvature matched the local surface curvature. This was repeated several times. Surface waviness was then measured and found to be no more than 0.005 inches (0.13 mm). In flight, this configuration was found to have a profile drag representative of boundary layer transition at 60% of chord.[23] This gave researchers an idea of what level of wing surface quality was required to actually get the benefits of laminar flow airfoils.

Postwar air racers

Numerous surplus P-63s ended up on the air racing circuit in the immediate postwar era. Charles Tucker purchased two P-63s from the disposal facility at Kingman, Arizona just after the war. He entered one of them, the *Tucker Special* as Race 28 with the name *Flying Red Horse* emblazoned on the nose (civilian register *N62995*) in the 1946 Thompson Trophy race. He had clipped the wings by 12 ft 9 in (3.89 m) in an attempt to improve its speed, reducing the span to 25 ft 9 in (7.85 m). The second one (*44-4126* (*XN63231* Race 30)) was intended for the 1946 Bendix cross country race. It was initially fitted with two wingtip drop tanks. In 1947, the drop tanks were removed and the wings were clipped to 28 ft 6 in (8.69 m).

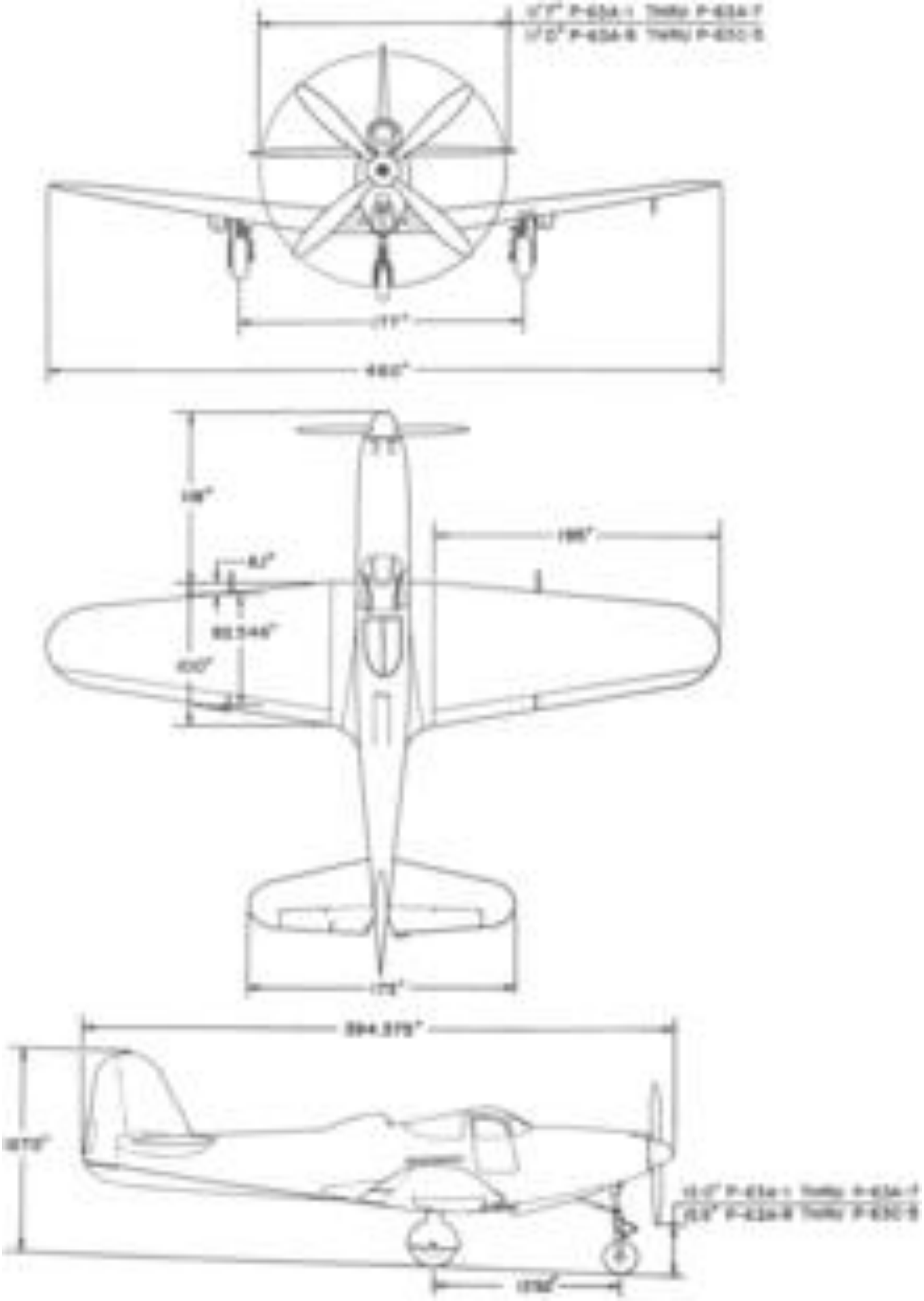
Bell RP-63C racer *Tipsy Miss* wearing No. 28 at Oshkosh Wisconsin in 1974.

Two other significant racers were flown later. *Tipsy Miss*, John Sandberg's clipped-wingtip P-63 unlimited racer, was identified as "Race 28," and painted in bright orange, white and black race numbers with a chrome spinner. Later sold to a European pilot, this P-63 was destroyed in a fatal accident in 1990[26][27] *Crazy Horse Campgrounds* was the most radically modified P-63 Kingcobra ever. Larry Haven's "Race 90" clipped-wing unlimited racer had a tiny bubble canopy installed; it appeared in all silver (unpolished aluminum) finish with a white rudder and black trim. The aircraft later crashed into the ocean on a test flight in 1972.[28]

Accidents and incidents

On 3 June 2001, a Bell P-63A crashed during the Biggin Hill International Air Fair in London, England, killing the pilot. The pilot was at the top of a vertical maneuver when he appeared to have lost control of the plane. This was the second plane accident in 24 hours at Biggin Hill following the crash of a de Havilland Vampire that killed both pilots.[48][49][50] On 12 November 2022, P-63F 43-11719, owned by the Commemorative Air Force, collided with Boeing B-17G Flying Fortress *Texas Raiders* at an airshow in Dallas, Texas. 43-11719 was one of only five remaining airworthy P-63s and was one of the few P-63F variants ever built.[51] Six people were killed, one in the P-63 and five in the B-17.[52]

Specifications (P-63A)



General characteristics

- **Crew:** One
- **Length:** 32 ft 8 in (9.96 m)
- **Wingspan:** 38 ft 4 in (11.68 m)
- **Height:** 12 ft 7 in (3.84 m)
- **Wing area:** 248 sq ft (23.0 m^2)
- **Airfoil: root:** NACA 66-116; **tip:** NACA 66-216[54]
- **Empty weight:** 6,800 lb (3,084 kg)
- **Gross weight:** 8,800 lb (3,992 kg)
- **Max takeoff weight:** 10,700 lb (4,853 kg)
- **Powerplant:** 1 × Allison V-1710-117 V-12 liquid-cooled piston engine, 1,800 hp (1,300 kW)
- **Propellers:** 4-bladed constant-speed propeller

Performance

- **Maximum speed:** 410 mph (660 km/h, 360 kn) at 25,000 ft (7,600 m)
- **Range:** 450 mi (720 km, 390 nmi)
- **Ferry range:** 2,200 mi (3,500 km, 1,900 nmi)
- **Service ceiling:** 43,000 ft (13,000 m)
- **Rate of climb:** 2,500 ft/min (13 m/s)
- **Wing loading:** 35.48 lb/sq ft (173.2 kg/m^2)
- **Power/mass:** 0.20 hp/lb (0.33 kW/kg)

Armament

- **Guns:**
  - 1 × 37 mm (1.5 in) M4 cannon firing through the propeller hub. From the A-9 version of the aircraft onward, the M4 gun was replaced with the slightly improved M10 37 mm cannon, which used a disintegrating link ammunition belt, increasing the ammo capacity to 58 rounds; the M10 also had a slightly higher rate of fire.[55]
  - 4 × 0.50 in (12.7 mm) M2 Browning machine guns (two synchronized in the nose, two in the wings)
- **Bombs:** 1,500 lb (680 kg) bomb load on wing and fuselage

Source : https://en.wikipedia.org/wiki/Bell_P-63_Kingcobra