Hughes H-1 Racer

H-1 Racer as it looked in 1935

The **H-1** was a racing aircraft built by Howard Hughes' company in 1935. It set a world airspeed record and a transcontinental speed record across the United States.

History

During his work on his movie *Hell's Angels*, Hughes employed Glenn Odekirk to maintain the fleet of over 100 aircraft used in the production. The two men shared a common interest in aviation and hatched a plan to build a record-beating aircraft. The plane was given many names, but is commonly known as the **H-1**. It was the first aircraft model produced by Hughes Aircraft Corporation. Many groundbreaking technologies were developed during the construction process, including individually machined flush rivets that left the aluminium skin of the aircraft completely smooth. Also it had retractable landing gear to further increase the speed of the plane. It was fitted with a Pratt & Whitney R-1535 twin-row 14-cylinder radial engine of 25.2 liters, putting out over 1,000 horsepower (750 kW).

The H-1 first flew in 1935 and promptly broke the world land-plane speed record with Hughes at the controls, clocking 352 mph (566 km/h) averaged over 4 timed passes. Hughes apparently ran the plane out of fuel and managed to crash-land without serious damage to either himself or H-1. As soon as Hughes exited the plane when he crashed it in a beet field, his only comment was: "We can fix her.

She'll go faster." At the time, the world seaplane speed record was 440 mph (709 km/h), set by a Macchi M.C.72 in October 1934.

Hughes later implemented minor changes to the H-1 Racer to make it more suitable for a trans-continental speed record attempt. The most significant change was the fitting of a new, longer set of wings that gave the plane a lighter wing loading. On the 19th of January in 1937, a year and a half after his previous land-plane speed record in the H-1, Hughes set a new trans-continental speed record by flying non-stop from Los Angeles to New York City in 7 hours, 28 minutes and 25 seconds. He smashed his own previous record of 9 hours, 27 minutes by two hours. His average speed over the flight was 322 mph (518 km/h). [1]

Hughes fully expected the United States Army Air Forces to embrace his plane's new design and make the H-1 the basis for a new generation of U.S. fighter planes. However, for reasons that are obscure, this did not happen. Instead, when World War II started, the USAAF was fielding a fleet of P-39 Airacobras and P-40 Warhawks. After the war, Howard Hughes claimed that "it was quite apparent to everyone that it [the Japanese Zero] had been copied from the Hughes [H-1 Racer]." Hughes had most likely made this statement with reference to both the wing planform, and the tail empennage design, the similiairty of the Zero's and his racer's being striking.(Howard Hughes, in his own words). Other aviation historians have suggested that the H-1 Racer inspired other radial-engine fighters such as the P-47 Thunderbolt, and the Focke-Wulf Fw 190 (William Wraga (2000)). However, there is no direct testimony from the other aircraft designers which would support these ideas, nor is such evidence likely to be found. Further, the P-47 was derived from the Seversky P-35, which in turn can be traced back to earlier Seversky models predating the H-1.

The original H-1 Racer was donated to the Smithsonian in 1975 and is on display at the National Air and Space Museum.

The H-1 Racer was the last plane built by a private individual to set the world speed record; every aircraft to hold the honor since was designed by military forces.

A replica of the H-1 was built by Jim Wright of Cottage Grove, Oregon, and first flew in 2002, but was destroyed in a crash on August 4, 2003, killing Wright. Wright, at the time, was trying to return to Oregon from Oshkosh, Wisconsin, where he had displayed the plane at the Experimental Aircraft Association's 2003 event. On his way home, he landed briefly in Gillette, Wyoming, to refuel. While on the ground in Gillette, Wright met briefly with local reporters and said that the plane had been having "gear problems," which he likely meant as an analogy between the modified Hamilton Standard constant speed propeller and an automobile transmission stuck in low gear. He then departed, crashing about an hour later, just north of the Old Faithful Geyser in Yellowstone National Park.[2] The official accident report [3] indeed points to a failure of a counterweight on the constant speed propeller. On December 17, 2003, Cottage Grove State Airport was dedicated as Jim Wright Field.

Trivia

The second set of wings were painted blue, but the original (short-span) wings were painted red. Various documents (including an article from TIME magazine, Sep 23, 1935) confirm this, but it is still a little-known fact since there are no color photographs of the plane from the 1930s and the wings have always been depicted as blue in modern media (such as in the film The Aviator).

Over time, the wings have been marked with the registration numbers "NR258Y", "NX258Y", and finally, simply "R258Y". Several photos exist of a transitional period in which the "X" was painted directly on top of the "R" (see the photo at the top of this page). The color of the registration letters at

the time of the record setting flights is said to have been white. Hughes later repainted the letters to the current yellow color to match the color of his company's logo.

Specifications (H-1 Racer, original wings)

The H-1 Racer at the National Air and Space Museum

General characteristics

- **Crew:** 1
- **Length:** 27 ft 0 in (8.23 m)
- **Wingspan:** 31 ft 9 in (9.67 m)
- **Height:** ()
- **Wing area:** 138 ft² (12.8 m²)
- **Empty weight:** 3,565 lb (1,620 kg)
- **Loaded weight:** 5,492 lb (2,496 kg)
- **Powerplant:** 1× Pratt & Whitney R-1535[4] radial engine, 700 hp (521 kW)

Performance

- **Maximum speed:** 352 mph (566 km/h)
- **Wing loading:** 40 lb/ft² (195 kg/m²)
- **Power/mass:** 0.13 hp/lb (210 W/kg)

Sources

- Howard Hughes - Aviator UNLV Library Web Site
- Wright Tools - History of the H-1
- The H-1 Racer - National Air and Space Museum Web site
- http://www.aafo.com/racing/history/hughes_racer/update-2/thestory.htm

Related content

Designation sequence

H-1 - H-4

Howard Hughes Aviator In His Own Words

Hughes: "It says the plane with which he set the land speed record was, as the fact indicates, the fastest plane built up to that time is not correct because there had been one or two seaplanes built for the Schneider Trophy Race which were faster. However they had practically no range and were only usable on a very very smooth lake with fuel enough for a few minutes flight, utterly impractical. This airplane [H-1 Racer] which is under discussion here was the fastest land plane which had ever been built and was the most efficient airplane ever built up to that time by a considerable amount . . . You see this airplane was fast because it was clean and yet it attained its speed with a Pratt and Whitney engine of perfectly normal design with normal reliability.

Now this follows - Hughes submitted a pursuit plane version of his design to the Army Air Corps and felt confident that after his demonstration of his trans-continental flight the army would be interested because this airplane was definitely faster than any military aircraft anywhere in the world - pursuit plane, bomber, or anything else. . . However the Army Air Corps did not accept this design. Right here I don't know exactly what reason to give. I don't want to indict the Army Air Corps for passing up the airplane so a little thought should be given to this. I have my own ideas as to why they didn't accept it but after all I'm doing a lot of business now with the Air Force and let's not generate any ill-will here.

Now regarding the Japanese Zero . . . The Japanese Zero was a shock of the utmost magnitude to the United States because it had been thought up to that time that the Japanese were far inferior mechanically, I should say in point of aircraft design and mechanical aptitude, to the United States and nobody expected the Japanese to have an airplane that would be at all competitive. Well, in any event, when one of these Japanese Zeros was finally captured and studied and analyzed it was quite apparent to everyone that it had been copied from the Hughes plane which has been discussed earlier here. That is the only relationship between the Japanese Zero and the Hughes H-I design. I had no dealings with the Japanese or any other foreign government for the plane and to the best of

everyone's knowledge the Japanese had no other access to it except through whatever espionage they may have had or through seeing photographs of it which naturally were published all over the world.

Bill Utley: (attending the meeting as the Hughes company publicist, recounts how before the war a delegation of Japanese air force generals had seen the H-1 in a hangar in New Jersey) "They were late for a banquet in New York where they were being toasted and they saw your airplane and I have been told by Al Ludwick I think, that they couldn't drag them away from it, that they climbed all over it, that they examined it from head to toe, and that was the start of their interest in your airplane"

Hughes: Oh, really?

Utley: Yeah.

Hughes: Well, I don't think we better bring that in because there might be some question as to why the hell they were let in the hangar.

Utley: They had been invited here by the United States Government

Hughes: I know, but you can't explain all those things without going into too much detail

. . . There were photographs all over the place and I don't think the Japanese would have to see it to copy it - they could copy it from the pictures.

Boeing Special Biplane 1932

larger image

Hughes standing in front of his re-modeled Boeing Special army pursuit bi-plane, 1932.

larger image

Hughes in front of bi-plane holding the trophy, after winning All-American Air Meet in Miami in the category "sportsman pilot free-for-all," 1934.

Hughes H-1 Racer 1935

larger image

larger image

larger image

The H-1 racer (NX 258Y - X painted over earlier R designation).

larger image

taking off from Santa Ana, California, September13, 1935.

Hughes Northrop Gamma Racer 1936, coast to coast speed record

larger image

larger image

larger image

larger image

Gamma Racer, Newark New Jersey, January 1, 1936.

http://www.wrightools.com/hughes/h1_history.htm

Hughes H-1 Racer

In 1935 Howard Hughes built what would become the worlds fastest single engine land aircraft, the Hughes H-1 Racer.

The Hughes H-1 racer was developed to be the fastest landplane in the world, It was designed by Howard Hughes and Richard Palmer as well as a small team of engineers, and built by Glenn Odekirk and his team. On September 13, 1935, Hughes achieved the design goal by flying the H-1 to a new world speed record of 352.322 mph. The record was set over a specially instrumented course near Santa Ana, California.

Since Hughes did not require a sponsor for the aircraft, the H-1 had no markings except the license number NR258Y (later NX 258Y) in chrome yellow against the dark blue background of the wings, and in black against the doped aluminum rudder. The fuselage was left in its natural polished aluminum finish. The H-1 was powered by a Pratt and Whitney Twin Wasp Jr. radial piston engine, which was rated at 700 horsepower at 8,500 feet but which could deliver 1,000 horsepower for high-speed flight. A wind tunnel model of the aircraft was exhaustively tested in the 200-mph wind tunnel at the California Institute of Technology's Guggenheim Aeronautical Laboratory. Actual performance figures for the aircraft closely matched the predicted design performance.

The H-1 had two sets of wings, The wings Hughes used to break the land plane speed record were of

a low aspect ratio and shorter than those with which it is now fitted. The wings now fitted on the aircraft span 31 feet, 9 inches. have a moderate-aspect ratio, and were used when Howard Hughes broke the transcontinental speed record in the H-1 on January 19, 1937. Surprisingly, Howard mentioned in a later interview that the longer wings did not detract from overall performance - hinting that wing loading was too high for the available horsepower with the shorter wings. Hughes also fitted a different propeller onto the aircraft from the one used during his land plane speed record. (According to our conversations with an engineer on the original H-1, John Newberry, there where several different propellers tested).

Hughes departed Los Angeles before dawn and arrived at Newark Airport, outside New York City, 7 hours, 28 minutes, and 25 seconds later. His average speed over the 2,490-mile course was 332 mph, and this nonstop flight was truly an outstanding accomplishment - especially in light of the fact that he had been forced down to 14,000 feet due to an oxygen system malfunction. Had he been able to fly the originally planned altitude of 21,000 feet his time may well have been much faster.

The Hughes H-1 was designed for record-setting purposes, but it also had an impact on the design of high-performance aircraft for years to come. Some of the outstanding design features of the H-1 were: a close fitting bell-shaped engine cowling to reduce airframe drag and improve engine cooling; gently curving wing fillets between the wing and the fuselage to help stabilize the airflow, reduce drag, and prevent potentially dangerous eddying and tail buffeting; hydraulically retractable landing gear (a first on land aircraft) to reduce drag and increase speed and range (typical of everything on the H-1, the landing gear was so perfectly fitted that the gear fairings and doors are difficult to see without looking closely); all rivets and joints flush with the aircraft's skin and flathead and countersunk screws on the plywood wings; ailerons designed to droop 15 degrees when the flaps are fully extended to improve lift along the full length of the wing during landing and takeoff; the pilot sitting in a smoothly faired and totally enclosed cockpit during cruise. During take off and landing, the side windows were lowered into the fuselage, the windscreen slid forward, and the seat was raised to allow for more forward visibility.

The Hughes H-1 racer was a major milestone aircraft on the road to such radial engine-powered World War II fighters as the American Grumman F6F Hellcat and Republic P-47 Thunderbolt, the Japanese Mitsubishi Type 0 (Zero), and the German Focke-Wulf FW 190. It demonstrated that properly designed radial-engine aircraft could compete with the lower-drag inline designs despite having larger frontal areas because of their radial engine installations.

The H-1 was kept in the Hughes factory at Culver City, California, until it was donated to the Smithsonian Institution in 1975. It is now exhibited in the Golden Age of Flight gallery of the National Air and Space Museum.

Special thanks to Mr. Edmund I. "Skip" Eveleth, former test engineer on the Pratt & Whitney R-1535 Twin Wasp Junior.

Special thanks to Mr. John Harvey Newbury, a member of the original H-1 design team.

Special thanks to Mr. Peter Palmer, nephew of H-1 designer Richard Palmer for allowing acquisition of original artwork by Alfred Owles.

Hughes H-1 Racer Forum.

Click here to view current construction photos.

Click here to view photos of The Racer Team.

All major sheet metal work is complete.

Controls are installed and balanced.

Engine and propeller are installed.

Estimate 7,000 man hours until completion.

Photos by Eric Preston.

Home

http://www.aafo.com/racing/history/hughes_racer/update-2/thestory.htm