

Hughes H-1 Racer and Howard Hughes



By Adam Estes

Howard Hughes standing with the Hughes H-1 Racer at Union Air Terminal, Burbank, California. (From the Gerald Balzer collection, AAHS archives)

Howard Hughes is a name that is synonymous with many things, from billionaire playboy to reclusive tycoon, from daring risk-taker to hypochondriac. In the world of aviation, Hughes is known for such films as *Hell's Angels* and *Jet Pilot*, the H-4 Hercules flying boat (better known by its derisive nickname, the "Spruce Goose"), helicopters such as the OH-6 Cayuse, and spacecraft such as the Surveyor landers and the Magellan satellite, but before all that, Howard Hughes' first venture into creating an aircraft of his own vision was one of the sleekest planes of its day, with wide-reaching impacts on aerospace design. Dubbed the "Hughes Mystery Ship" by the press and known officially as the Hughes 1B Special, it is known to history through later publications as the Hughes H-1 Racer.

Howard Robard Hughes, Jr. was, if nothing else, ambitious. His father Howard Sr. had established the fortune that would fuel his son's projects through the establishment of the Hughes Tool Company, known for drill bits used in the oil industry. Upon inheriting his father's company at a young age, Hughes sought out more exciting ventures, becoming a film producer and director who created some of the most elaborate and

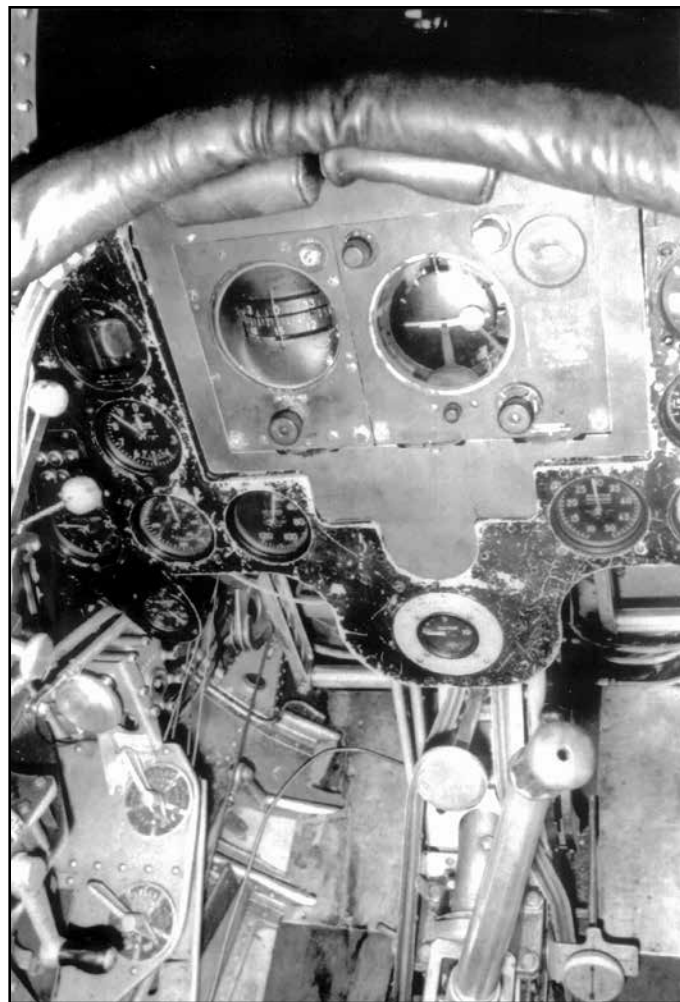
boundary-pushing films of the day, most notably the classic WWI aviation film *Hell's Angels*. But if there was anything Hughes loved more than movies, it was flying. Outside of *Hell's Angels*, Hughes first came to prominence in the world of aviation when he won the Sportsman Pilot Free for All during the 1934 All-American Air Meet in Miami, Fla., flying a highly modified Boeing 100 (the civilian version of the P-12/F4B fighter). However, he sought to go much faster, with the intent of breaking the world landplane speed record. After a consultation with engineer Glenn Odekirk in Miami, Hughes was determined to use his finances to build the fastest landplane up to that point.

To achieve this vision, Hughes would delegate the design process to Richard "Dick" Palmer and install Glenn Odekirk as project manager. Palmer's design team crafted models of airfoils, engine cowlings, and tail surfaces in a rented garage before testing them in the wind tunnel of Palmer's alma mater, the California Institute of Technology (Cal Tech) in Pasadena. Palmer assembled a team to build the H-1 in secret at Grand Central Air Terminal in nearby Glendale. The press was aware

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Photo taken by Dusty Carter of the Hughes H-1, NR258Y running its engine at Union Air Terminal, Burbank, CA, 1935 (now Hollywood-Burbank Airport). (AAHS archives, AAHS-D005819)



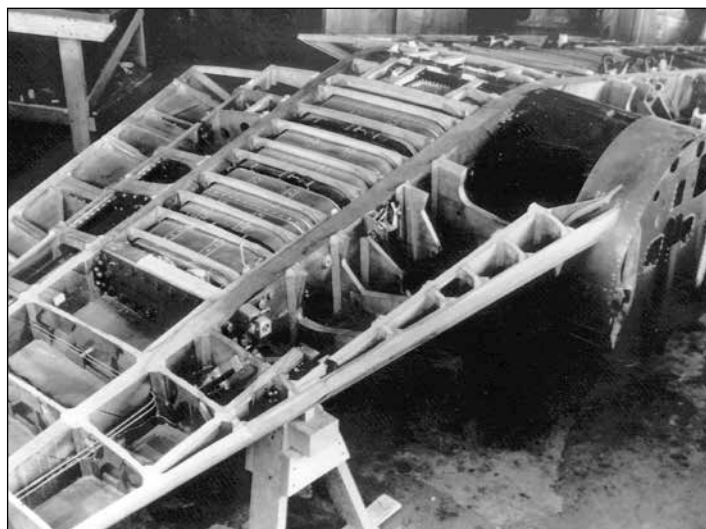
Photograph of the H-1 Racer's instrument panel after it was donated to the National Air and Space Museum. (AAHS archives, AAHS-D005820)



Front view of the 1B short wing version during engine run at the Santa Ana Airport. (From the Gerald Balzer collection, AAHS archives)



Engineers inspect the engine of the Hughes H-1 Racer before the test flight at Mines Field, Los Angeles, August 1935. (AAHS archives, AAHS-S051336)



Construction of the long-wing set showing the inverted structure, fuel tanks, and landing gear wells. (AAHS archives, AAHS-D005818).



The Hughes H-1 Racer photographed at Hughes Airport, Culver City, Calif., November 14, 1945. (AAHS archives, AAHS-56137)



Howard Hughes sitting on the prop hub of the 1B in the beet field after his record-breaking speed run. The general consensus is that Hughes suffered from Obsessive Compulsive Disorder. There are reports that he spent hours with the reporters staging the photos and motion picture recordings at this site. (The Gerald Balzer collection, AAHS archives)

that Hughes was building a new airplane, but due to the secrecy involved in concealing the details of the aircraft from the public, the press originally dubbed it the “Hughes’ Mystery Ship.” Though it was not *the* first airplane to have this feature, one of the most distinguishing characteristics of the 1B Special were the flush rivets that gave its aluminum fuselage a smooth surface that greatly reduced drag on the airframe.

Its wings, however, were made of wood to save weight and get the best contours to reduce drag. This was achieved through meticulously shaping, sanding, and varnishing the airfoil. The wings were only 24 feet, 5 inches in span. It featured a wide-width retractable landing gear. The plywood skin was sanded until it glistened in the California sun.

On August 17, 1935, the 1B was rolled out for the first time, no doubt stunning all who were lucky enough to see it that day. The plane was then trucked from Glendale to Mines Field (now Los Angeles International Airport). Hughes clambered into the cockpit, fired up the plane’s Pratt & Whitney R-1535 Twin Wasp Junior and they took off into the skies above Los Angeles. During the 15-minute flight, Hughes had difficulties with the constant speed propeller, which prevented him from going faster than 250 mph. It was later discovered upon inspection that the bevel gears in the propeller governor had not been aligned and had chewed each other up. Consequently, a new propeller was ordered from Hamilton-Standard in Connecticut. On August 28, with the new propeller having been flown in and installed, Hughes set off to Union Air Terminal in Burbank (now Hollywood-Burbank Airport). This time, the landing gear would not extend on approach, despite every effort by Hughes to extend the gear. It was only because of the emergency oil valve placed by Odekirk that forced oil from the engine to push the hydraulically-operated gear to the extended position that Hughes did not bail out. The cause of this incident turned out to be the main hydraulic pump, which had blown its gasket. A new one was installed and no further issues came up.

1B Record Setting

After two more test flights out of Burbank on September 9 and 11, Hughes brought the 1B to Santa Ana with only around a total of three hours of flight time, where he intended to break the

landplane speed record set by Frenchman Raymond Delmotte at Istres, France, on Christmas Day, 1934 in a Caudron C.460 Rafale, averaging at a speed of 314.32 miles per hour.

On September 12, 1935, at Eddie Martin Field (just a mile north of present-day John Wayne Airport), Hughes would set off on a specially-marked course parallel to the airfield for him to be timed. Among the observers were timekeepers William R. Enyart for the *Federation Aeronautique Internationale* and Larry Therkelsen from the National Aeronautic Association, and flying above to make sure he stayed below a prescribed altitude for the flight were Amelia Earhart and movie pilot Paul Mantz in Earhart’s red Lockheed Vega 5C, NR965Y, which she used in her Hawaii-California flight earlier that year. Hughes made four runs in the late afternoon to early evening hours and was barreling in on a fifth pass when he was signaled to land by the team on the ground. The reason for this was that the photo-cells being used to record the attempt no longer had sufficient natural light to make a proper recording. With evening settling in, Hughes would make another attempt on the record the next day.

After a restless night of tinkering with the airplane, Hughes was ready for another attempt at the landplane speed record. He only had a limited amount of fuel on board, enough to complete a few laps. Once again, Hughes took off. Paul Mantz and Amelia Earhart again would fly above him to verify that he was within the set altitude for the speed run, while Enyart and Therkelsen timed his runs. On this day, Hughes averaged 352.39 miles per hour, and even reached speeds approaching 370 mph. But these high speed, low altitude passes consumed all the fuel in the main tank, and the engine quit. Hughes attempted to switch to his auxiliary tanks, but he was losing too much altitude too quickly for the auxiliary tanks to take effect. Emergency services from the field tracked his rate of descent as he prepared to make a wheels-up landing in a nearby beet field. When they found Hughes, he was uninjured, and calmly sitting on the H-1, which had only suffered minor damage. Hughes asked them coyly, “Did I make it?” To which Paul Mantz laughingly replied, “Howard, you broke the record, and you are the luckiest son of a bitch I ever saw!”



Three Quarter frontal view of the 1B in its long wing configuration. Based on the registration, this photo was taken at the Hughes Airport in Culver sometime after 1941. (AAHS archives, AAHS-56134)

Indeed, the aircraft would be sent back to Burbank for repairs. When Palmer and Odekirk came to him, Hughes told them, “She’ll go faster.”

As soon as the FAI had certified Hughes’ record, Howard Hughes and Dick Palmer immediately began discussing the possibility of new flight for the 1B. “It’s a beautiful airplane, Dick” Hughes said, “I can’t see why we can’t use it all the way.” This was Hughes’ reference for a transcontinental speed record.

Following this conversation, Palmer and Odekirk went back to work designing and building a new pair of wings to go “all the way.” Meanwhile Hughes continued his playboy lifestyle of flying airplanes around the country, going out on his yacht in New York, and attending dinner dates with Hollywood stars such as Katherine Hepburn and Ginger Rogers. Perhaps his most notable achievement in aviation during this interlude was when he leased Northrop Gamma 2G NC13761 from Jacqueline Cochran.

This was the aircraft she had used in her attempts for both the 1934 MacRobertson Air Race from England to Australia and the 1935 Bendix Trophy race. Hughes modified the Gamma with a new Wright Cyclone engine and additional fuel tanks, and on January 14, 1936, he set a new transcontinental record from Burbank to Newark, N.J., in 9 hours, 26 minutes, 10 seconds, at an average speed of 259 mph at 15,000 to 18,000 feet. The aircraft was later returned to Cochran, who reinstalled the Twin Wasp Jr. engine that Hughes had removed.

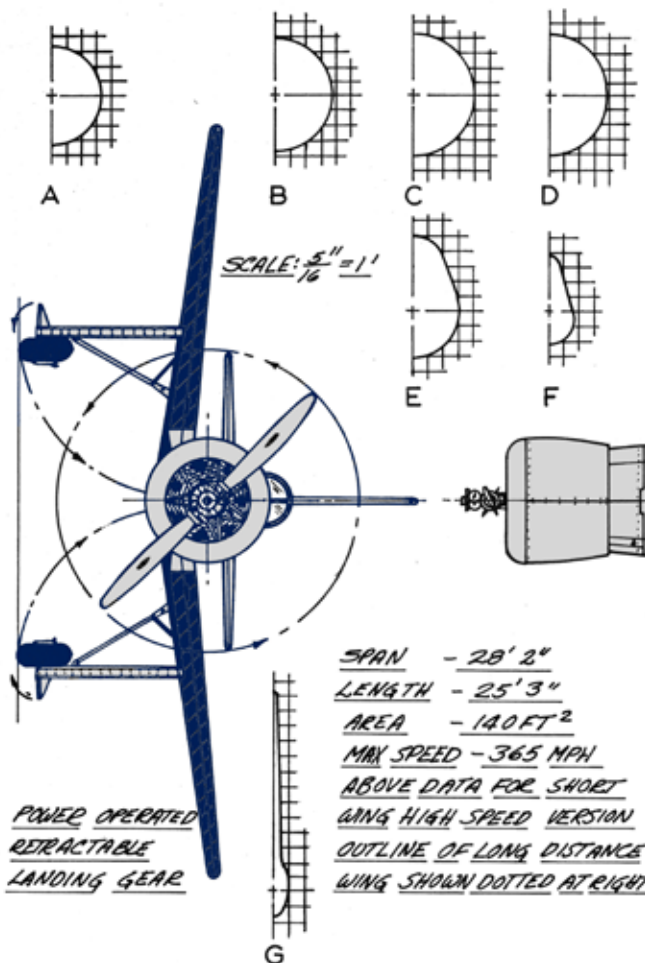
By the end of 1936, the 1B was ready to fly with its new pair of wings. In addition to the new wings, the Twin Wasp Jr. was modified for greater power and endurance and a new propeller was added, along with a radio and oxygen system. In addition to the pre-existing fuselage tanks, the additional tanks in the longer set of wings now brought the fuel capacity

up to 280 gallons. On December 28, 1936, Hughes made two flights in the 1B with the long wings, and made a further two on January 17. The next evening, January 18, Hughes had a series of speed runs at various altitudes between Santa Monica and Burbank, and upon completing these runs, Hughes and Odekirk made separate calculations for the plane’s fuel consumption rate and arrived at the same figures. No sooner had the calculations been confirmed did Hughes announce, “Hell, I can make New York at that rate. Check her over and make the arrangements. I’m leaving tonight.” Odekirk was initially stunned at this, but by this point, he knew that once Hughes had put his mind to something, nothing could sway him from his path.

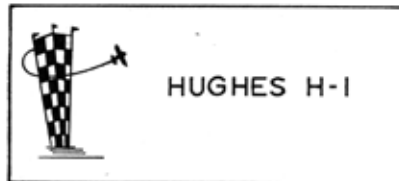
At the time, Dick Palmer was in New York, and received an urgent long-distance call from Odekirk. Up until that point, Palmer had been unaware of the fuel consumption checks and thought Hughes was too reckless. Like Odekirk, he also knew he couldn’t talk Hughes out of something he was committed to.

In the pre-dawn hours of January 19, 1937, at 2:14 am PST, Hughes set off in the H-1 from Burbank’s Union Air Terminal to break his own record set in Cochran’s Gamma. Hughes essentially retraced the path he took in Cochran’s Gamma a year prior, only faster. He arrived at Newark at 12:42 pm EST in 7 hours 28 minutes and 25 seconds, averaging 332 miles per hour. He may have landed a few minutes earlier too, were it not for the fact that Newark tower had him maintain a holding pattern while a United Air Lines Douglas DC-3 was taking off.

Because he flew in on short notice for the press, he performed a short demonstration flight to the newsreel cameras after discussing the transcontinental flight in detail with Palmer. This would be the last time Hughes flew the 1B, which would spend several months in Newark before being flown back to Burbank by Allen Russell, a corporate pilot for newspaper

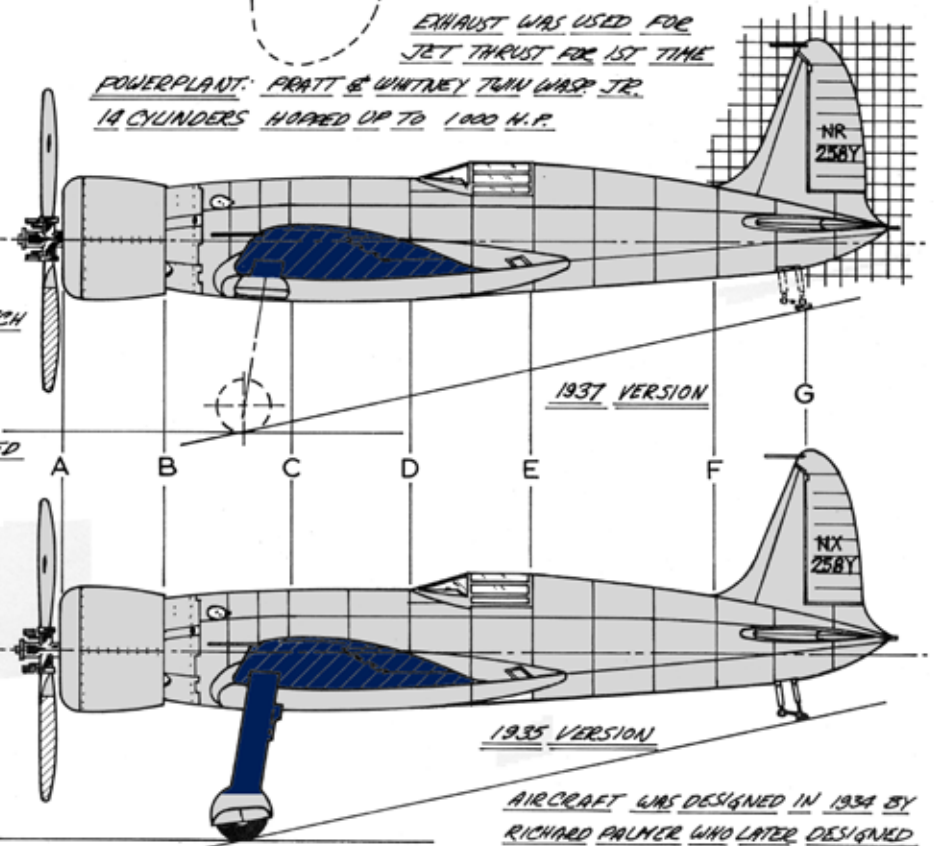
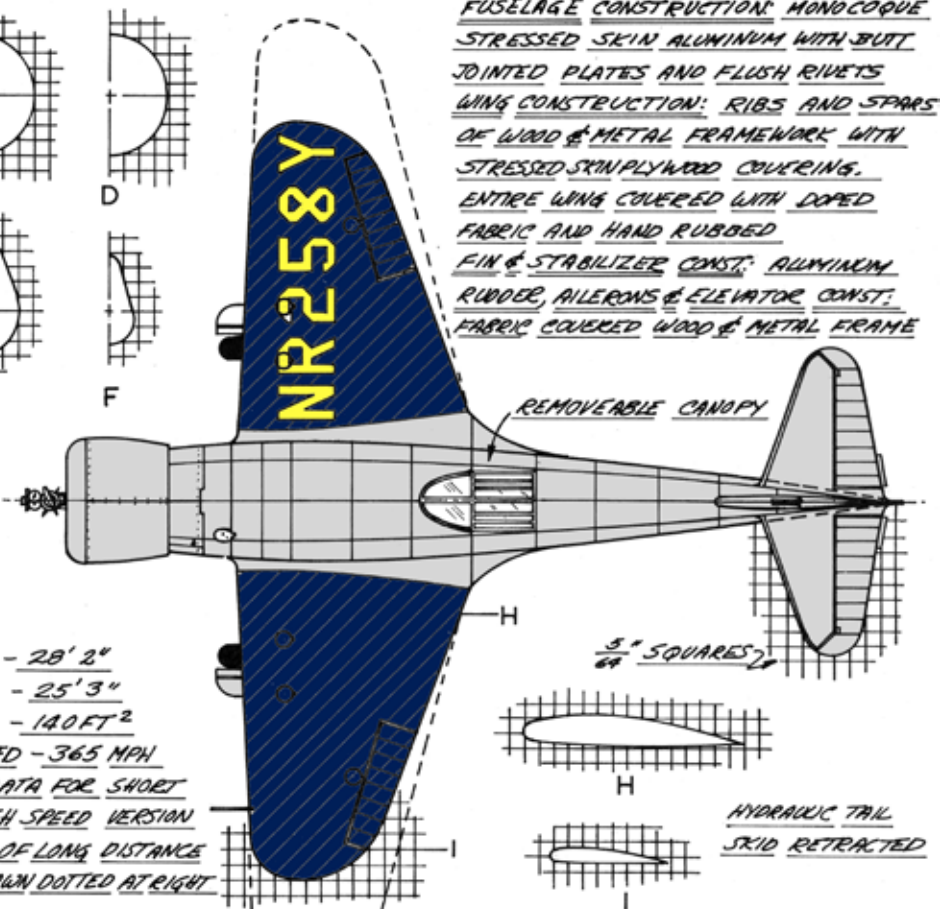
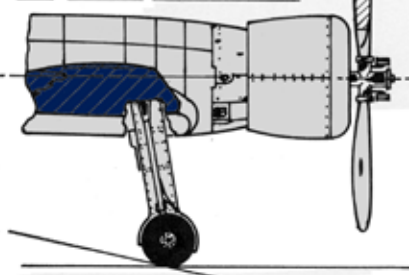


POWER OPERATED
RETRACTABLE
LANDING GEAR



PROPELLER: HAMILTON STANDARD
CONSTANT SPEED CONTROLLABLE PITCH
COLOR SCHEME: HIGHLY WAIVED
NATURAL ALUMINUM FUSELAGE AND
TAIL, WINGS WERE BLUE WITH
WHITE NUMERALS, ALSO HIGHLY WAIVED

HUGHES HAD PLANNED TO
FLY SHIP IN '36 NATIONALS
BUT LATER WITHDREW.



FLOWN BY HOWARD HUGHES TO A WORLD'S LANDPLANE SPEED RECORD OF
332.388 MPH ON 9-13-35 ON 1-17-37 HUGHES SET LOS ANGELES TO
NEW YORK RECORD (7 HRS 28 MIN 10 SEC). AT 332 MPH AVERAGE SPEED



Howard Hughes leaving the cockpit of Jacqueline Cochran's Northrop Gamma 2G at Newark Airport, January 13, 1936. Hughes leased this Gamma from Cochran while the H-1 was being repaired in California. (From the Gerald Balzer collection, AAHS archives)

magnate William Randolph Hearst. In the meantime, Hughes was now set on breaking the round-the-world speed record, then still held by the late aviator Wiley Post. This effort would eventually lead to Hughes flying a Lockheed Model 14 Super Electra (named *New York World's Fair 1939*) around the world with a crew of five, in 91 hours from July 10-14, 1938. The flight beginning and terminating at Floyd Bennett Field in Brooklyn, New York. [Editor's Note: See the article on *Floyd Bennett Field* in this issue]

Hughes would make another attempt to market a militarized version of the 1B to the Army Air Corps, this time as an all-metal aircraft with a Pratt & Whitney R-1830 radial engine, but nothing came of this proposal. By 1938, Dick Palmer had moved on to Vultee Aircraft as chief engineer, where he would oversee the development of the BT-13 Valiant trainer, P-66 Vanguard fighter, and A-35 Vengeance dive bomber.

1B Special Moves On

In 1940, Hughes sold the title for the 1B Special to manufacturer Otto Timm, who in 1922, had been Charles Lindbergh's instructor. But this purchase by Timm had strings attached, as Hughes also bought a large number of stocks in Timm's aircraft manufacturing company, and thus indirectly maintained a fair amount of control over the airplane.

Timm and test pilot Vance Breese tested the 1B and even made their own attempt at marketing it as the basis for an Army fighter, but their efforts were just as unsuccessful as previous attempts under Hughes. However, Hughes requested that Timm and Breese re-register the aircraft under the experimental category (X) to prevent the government from taking the aircraft during WWII, which ensured it remained within Hughes' grasp. Not long after this, in 1941, Hughes bought the racer back from Timm and disposed of his stocks out of the company.

After Hughes purchased a plot of land to establish an airfield and manufacturing facility in Culver City, where the HK-1/H-4 Hercules "Spruce Goose" would be constructed in two massive hangars, he had the Racer moved to Hughes Airfield. It was stored in Hangar No. 24 and kept in airworthy condition per Hughes' orders. By the end of WWII, the Hughes 1B Special was now dormant, overshadowed by its eclectic owner's later activities. From his near-fatal accident in Beverly Hills flying the XF-11 photo-reconnaissance aircraft, to flying the Hercules flying boat in Long Beach Harbor, and his reclusive life afterwards, where Hughes often spent months at a time in hotel suites and penthouses from Las Vegas to Acapulco. A shadow of his former self, yet still involved with the inner-workings of his empire, including the donation of the Racer to the Smithsonian.



Howard "sold" the 1B to business partner Otto Timm in 1940, then bought it back and stored it in a hangar at the Hughes Airport in Culver City. Photo taken November 14, 1945. (AAHS archives, AAHS-56138)



Hughes donated the Racer to the National Air and Space Museum in 1975 where it was put on display in 1976 shortly after Hughes' death. Over the years, the exhibit has been changed a number of times. (AAHS archives, AAHS-S051306)

Donated to NASM

By 1975, with the building of the Smithsonian's National Air and Space Museum (NASM) in Washington, D.C., nearing completion, behind the scenes negotiations between Hughes and the National Air and Space Museum had born fruit. The 1B Racer would be on its way to Washington. Originally, the Racer was to be placed intact on a ship that would take the Panama Canal to the East Coast. Once it became clear that the H-1 would have to be disassembled in order to fit through the entrance doors of the museum, Hughes himself sent instructions to Culver City as to how the Racer was to be disassembled. He also specified that the Racer was to be repainted as it appeared when he landed

at Newark in January 1937. Among those who were involved in the refit were Richard Palmer and Glenn Odekirk.

Following completion of the refurbishment, the racer was trucked overland to D.C., but Hughes would never live to see the H-1 on public display. Instead, he died in-flight aboard a Learjet being rushed to Houston from his penthouse in Acapulco on April 4, 1976. The museum was officially dedicated on July 1. At the time the 1B Racer went to the Smithsonian, it only had 40.5 hours of flight time on it, with roughly half of that being logged by Hughes himself.

The Hughes Racer was displayed at the National Mall location in several galleries, most notably the Golden Age of Flight gallery. In 2019, ongoing renovations to the National Air and Space Museum location downtown Washington saw the H-1 and many other aircraft moved into new storage modules at the Steven F. Udvar-Hazy Center in Chantilly, Virginia. After a couple years of storage, the aircraft has been placed on display in the Udvar-Hazy Center's Boeing Aviation Hangar, in the shadow of the Boeing 367-80, and next to Darryl Greenamyer's record-setting Grumman F8F-2 Bearcat *Conquest I*. The aircraft is currently displayed disassembled with the wings and fuselage in adjacent jigs. According to curators at the museum, the 1B will not return to the National Mall, but rather stay at the Udvar-Hazy Center, and will eventually be fully reassembled on the spot where the wings and fuselage currently sit. When that day comes, the Hughes 1B Special/H-1 Racer will stand tall again.

While the original 1B is now in the Smithsonian, there are some full-scale replicas of the aircraft in other museums. One replica that was built for the filming of the Martin Scorsese film *The Aviator* is displayed at the Santa Maria Museum of Flight in Santa Maria, California, while the San Diego Air and Space Museum is currently constructing their own reproduction to go on static display. But of course, no retelling of the H-1 replicas/ reproductions is complete without mentioning the beautiful



The wings of Hughes H-1 Racer arrive at Steven F. Udvar-Hazy Center in Chantilly, VA, March 27, 2019. (Smithsonian Photo NASM2019-01192 by Mark Avino)

airworthy reproduction built by the late Jim Wright of Oregon, who was tragically lost with the aircraft in 2003, but which lives on in memory and in photos and videos freely available on the web. →

Special acknowledgments to Dr. Robert van der Linden of the National Air and Space Museum for providing archival material that was greatly beneficial in the making of this article.

Another note are the changes in registration on the Racer. Originally, when flying with the short pair of wings for the speed record in 1935, the wings and tail were emblazoned with

the registration NR258Y. After the long wings were added for the transcontinental record, it was R258Y, which is how Hughes had it repainted before sending the aircraft to the Smithsonian. During WWII, it was re-registered to NX258Y to prevent it from being requisitioned by the government for wartime exhibition purposes, which was how the aircraft appeared when in storage in Culver City until 1975.

- 1935-1936: NR258Y
- 1936-1940: R258Y
- 1940-1975: NX258Y
- 1975-Current: R258Y



While a number of 1B replicas have been made, the most notable was the short-lived Wright-Hughes seen here at the National Air Races at Reno-Stead Airport in September 2002. It was such an exact reproduction that the FAA was convinced to issue it c/n 2. It and its creator were unfortunately lost in a crash in Yellowstone National Park while returning to Oregon from EAA AirVenture in Oshkosh, Wis., in August 2003. (Al Hansen photo from the AAHS Archives, AAHS-D021163)