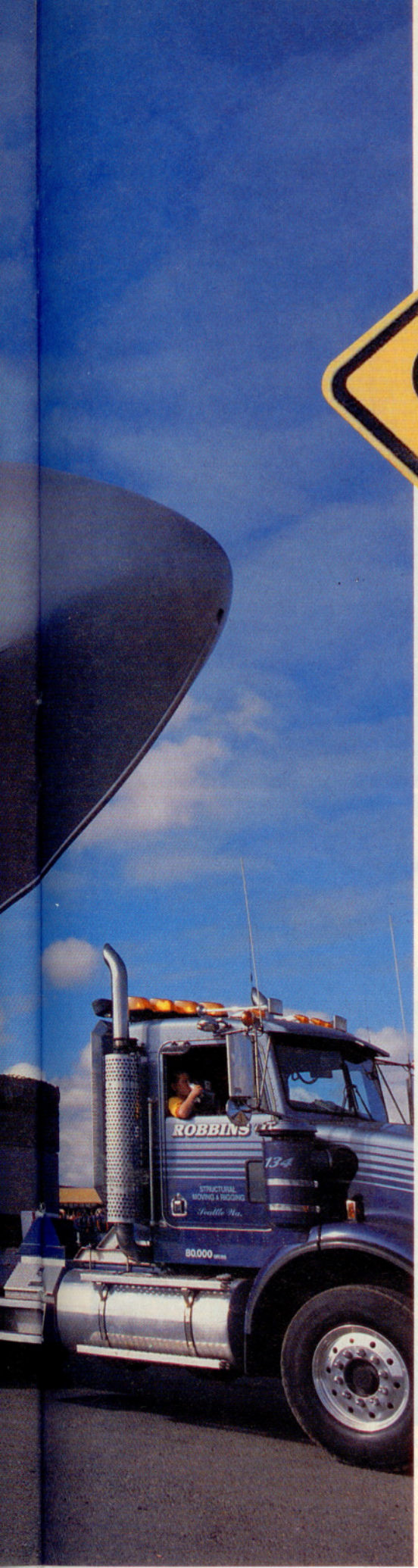

EVERGREEN



Caution Goose Crossing

A former confidant of Howard Hughes reveals secrets of the Spruce Goose

By Alton K. Marsh

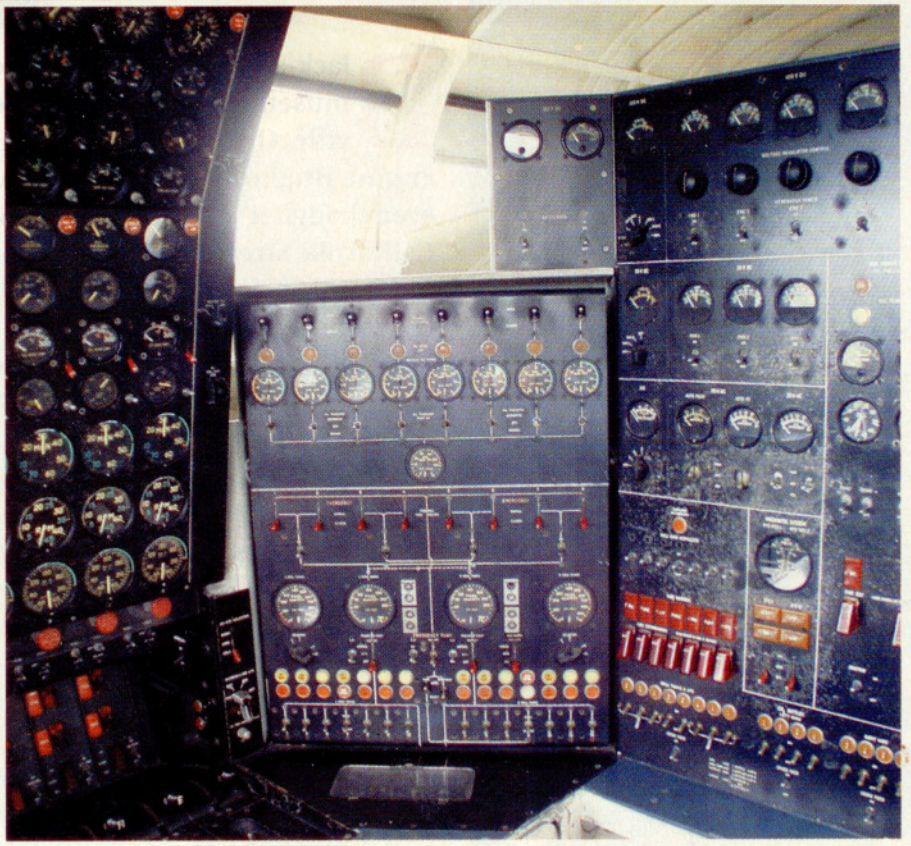
Black-and-white 1946 newsreel footage playing in the temporary museum at Evergreen International Aviation near McMinnville, Oregon, shows a strange procession. Parts of the eight-engine Hughes Flying Boat, dubbed the *Spruce Goose* by the press even though it was made mostly of birch, paraded down a Culver City, California, street on its way to Long Beach Harbor's Terminal Island. The two 160-foot wings were towed in separate frames by trucks, as were the fuselage and tail. Power lines were lowered and street signs removed to allow the caravan to pass. A house-moving company conducted the operation as groups of children, let out of school to watch the spectacle, lined the sidewalks. No one suspected that it would be 46 years before the Goose left Long Beach. ■ Hours before the footage was shown, and not 50 feet away from the Evergreen museum, history had repeated itself. Once again the Spruce Goose fuselage, looking like a beached whale with its tail raised, was towed by a house-moving company. This time it was going to a new home, the $16 million Captain Michael King Smith Evergreen Aviation Educational Institute across Highway 18 from Evergreen. As before, hundreds of children watched, this time marching in the parade of parts while chanting, "The Goose is loose." Street signs came down to allow the larger parts to pass before thousands of spectators. Standing there and dwarfed by the huge structure, it was as though Gulliver had brought his personal aircraft to the island of Lilliput. ■ The museum

PHOTOGRAPHY BY ANCIL NANCE

is expected to open next spring, where the Goose will be joined by several aircraft from an impressive collection of nearly 40 historic aircraft—more than a dozen of them flyable. The latter include a 1945 Boeing B–17G Flying Fortress, a 1928 Ford 5–AT Trimotor Tin Goose, a 1936 Douglas DC–3A, and a 1945 Supermarine Spitfire MK.XVI. The collection is now scattered among several locations but will be brought together in the new facility. The museum was the vision of Michael King Smith, an avid aviation enthusiast and military jet pilot who died in a car accident in 1995. He was the son of Evergreen owner and founder Delford M. Smith.

Counting temporary steel trusswork needed to protect the aircraft's components from damage during the move, the fuselage section weighed 130 tons, while each 160-foot wing weighed 95 tons. A fully loaded Hughes Flying Boat would weigh 200 tons and carry 750 troops. As it has done for 53 years, the boat once again delivered its cargo of secrets to a new destination. It is no less mysterious today, thanks in part to the reclusive Mr. Hughes.

However, the shrouds have begun to peel away from a few of the secrets, like



The throttle quadrant in the Spruce Goose cockpit (above) shows eight engines. The Goose was underpowered but more powerful engines were available.

Safely at its new museum, the Spruce Goose fuselage waits outside the building while the wings enter first.

the layers of paint that were sanded off by volunteers during these past eight years since the boat moved to McMinnville. The keeper of many of those secrets while Hughes was alive was Jack Real, a brilliant aeronautical engineer who worked on all the famous planes built by Lockheed during his 33-year career there, including the SR–71. He was at one time a handpicked successor to Clarence L. "Kelly" Johnson to take over the Lockheed Skunk Works, but he declined since he was 65 at the time. (He also worked with Howard Hughes to develop the Cheyenne and Apache military helicopters.) Now with Evergreen International Aviation, he was interviewed for this article. Real lived with Hughes all over the world during the last four years of Hughes' life.

The Spruce Goose has logged 982 miles by barge and by land, but only one by air. Yet the accidental flight—flying at 80 mph only 70 feet off the water—remains the most famous and controversial trip.

Popular aviation lore suggests that Hughes, who took over the flying boat project from shipbuilder Henry J. Kaiser, made the unauthorized flight during taxi tests on November 2, 1947, just to prove a point to critics in Congress. Actually, says Real, Hughes told him that the flight was accidental.

Supporting that theory is information about the flight in the book *Howard Hughes and His Flying Boat*, written by Charles Barton, a retired Navy captain living in Vienna, Virginia. Hughes pulled the throttles back immediately after realizing he was airborne, Barton reports in his book. Then Hughes powered up again and landed. If he had wanted to stay airborne, he would not have been startled into an immediate power reduction, some observers still feel. But the mystery continues. Others interviewed by Barton offered anecdotal proof that Hughes intended to fly because of mysterious comments that he made prior to the taxi tests, and because Hughes had made unauthorized flights during taxi tests of another new aircraft years earlier.

Hughes told Real this version of what happened.

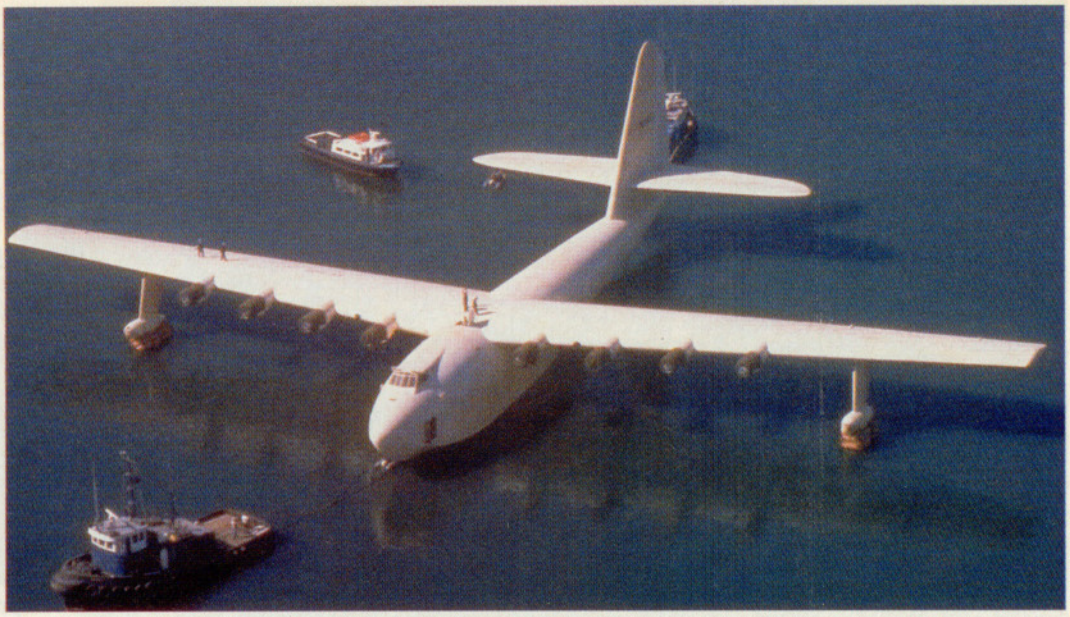
"Howard said, 'I don't know what I told the press after the flight, but I'll tell you. I had the poor man's high-lift device,'" Real recalled. "He had a 17-foot-diameter propeller. Takeoff was 2,700 rpm. He was on the step, and he finds out that while the aircraft's stall speed was probably 70 mph, he had an effective speed of maybe 90 mph, the reason being the high-velocity wind over the wing from the eight engines.

"Then he also said, 'You don't think I was going to fly on a first flight with 34 people? I was going to do it with three people. I put a little flaps on just to see if it could lift itself. Pretty soon I was in the air because of the high-lift device,'" Real said. There were eight men standing in the wings—one behind each engine—and one riding in the tail. In

Evergreen International Aviation submitted a proposal promising to display the Goose "with dignity." The new home for the aircraft does just that.

addition, there were members of the press and several guests on board. None was belted in at the time of takeoff.

Ground effect may have played a role in the inadvertent flight as well. After Hughes died, Real proposed a contract to the U.S. Navy to use the aircraft for tests, proving once and for all the aerodynamic characteristics of ground effect. Because of its huge 320-foot wingspan, such tests could have been flown at a comfortable altitude without worrying about recontacting the water. It could have been done in a day, Real said. The Navy, at first interested in the proposal, ultimately turned it down.



APWIDEWORLD

In October 1980, after being in storage for 33 years, the Spruce Goose was towed by tugboat to the Long Beach, California, harbor, where it was on display until 1990.

Real did not work on the aircraft, although he had worked on the engine design. In fact, he was working on a huge land-based aircraft for Lockheed that used the same 28-cylinder, 3,000-horsepower Pratt & Whitney R-4360 engines as the Spruce Goose. (The Lockheed aircraft flew a year earlier.) The engines were arranged in four rows of seven cylinders each. Despite nine years of research, the TBO on the engine was only 500 hours. Given the temperature on the day of the flight, Hughes probably had only 2,700 hp, Real said. Given his knowledge of the engines used on the prototype, Real said that the aircraft was underpowered. The empty weight was 220,000 pounds, while maximum takeoff weight was 400,000 pounds. It probably could not have carried that much with the R-4360 engines. There were other engines coming, however, that produced 3,300 hp each.

Real also knows a darker secret about the airplane—one that has been little publicized. "I spent my life in flight test with F–104s, C–130s, and Constellations. In flight tests, you worry about flutter. You don't want the wings to have the same dynamic [frequency] as the engines—as was the case later on with the second [Lockheed] Electra. His flutter people warned him that 'it looks a little suspicious [for the Spruce Goose] at 180 mph.' He was never going to get up to 180 until there were further tests," Real said.

Real has completed his own book revealing new details about Howard Hughes and his projects, tentatively titled *Howard Hughes' Last and Best Friend*. Negotiations with a publisher are in progress.

In addition to the potential flutter problem, according to Barton's book, there was an aileron problem. An engineer, Rea E. Hopper, told Hughes shortly before the taxi tests began that he had found a stress error in the aileron operating mechanism—one that was easy to fix at a later time. In a letter to Barton, Hopper quotes himself as telling Hughes, "Anyway, if you do want to go ahead with the flight, don't go over 140 mph." Hughes said something like, "Don't worry, I won't." But not even Hopper knows if the flight was accidental.

Another problem surfaced during the actual flight. According to the book, one person on board said that the tail was "twisting" in flight, so much so that he thought it would come off.

Delford Smith, an Air Force veteran who founded Evergreen Helicopters in 1960, and son Michael thought differently after wind-tunnel tests on a model of the Goose. Their information indicated that there was at least one more flight left in the well-preserved airplane; that would be a flight from Long Beach to McMinnville. They won the right to display the airplane through a competition by the Aero Club of Southern California.

HK–1 Hughes-Kaiser Flying Boat
Projected cost when new: $6 million
Actual cost at completion: $25 million

Specifications

Powerplants	
(8) Pratt & Whitney R-4360-4A, 3,000 hp	
Recommended TBO	500 hr
Propellers	
Hamilton-Standard; four-blade; 17 ft, 2 in dia	
Length	219 ft
Height	79 ft 3 in
Wingspan	319 ft 11 in
Wing area	11,430 sq ft
Wingtip deflection in flight	13 ft
Power loading	14.3 lb/hp
Seats	770
Hull width	25 ft
Hull height	30 ft
Empty weight	220,000 lb
Maximum gross weight	400,000 lb
Useful load	180,000 lb
Payload w/full fuel	95,000 lb
Fuel capacity, std	more than 14,000 gal (84,000 lb)
Oil capacity, central reservoir	280 gal
Cargo capacity	equal to two railroad boxcars

Performance

Rate of climb, sea level	916 fpm
Maximum level speed, sea level	234 mph
Maximum level speed, 5,000 ft	227 mph
Cruise speed/endurance	
(fuel consumption, ea engine)	
@ 75% power, best economy, 5,000 ft	
	150 mph/20.9 hr
	(449 pph/74.8 gph)
Service ceiling	17,400 ft
Range	2,975 sm

Limiting and Recommended Airspeeds

Final approach speed	87 mph
V_R (rotation)	70 mph
V_{S1} (stall, clean)	70 mph

All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted. Obviously, no performance figures were ever determined for the HK–1 from actual flight tests.

Walt Disney Company had acquired the lease to the Spruce Goose in 1988. It was Disney, Rear said, that cut the extra windows in the left side of the aft cockpit for the benefit of the viewing public. Two years later, Disney fired the Goose for failing to produce profits, and the Aero Club offered it to anyone who would display it with dignity and pay for its removal. It was Michael King Smith who wrote the 200-page winning proposal. Ultimately, the desire of those guarding the Hughes estate to not upstage Hughes, coupled with the difficulty of finding a suitable water landing site, resulted in abandoning plans to fly the aircraft.

The museum resulted from the younger Smith's vision, his father said.

"Michael had a burning desire to fly at an early age and was in our laps as a child [while in flight], so he got a lot of flight experience," Smith said. "He was a walk-in to the military flight program and graduated number one in his class. He joined the 123rd Fighter Squadron flying F–15s.

"We knew the HK–1 was being evicted by Disney, and we knew there was keen competition. But Mike was a prolific reader and could write very well, so he submitted a proposal to the Hughes estate. He explained that the artifact would be displayed with dignity, and that it wouldn't be a sideshow in a penny arcade."

The proposal pointed out that the timber for the HK–1 came (partially) from Oregon, and Evergreen had long been a customer of then Hughes Helicopters. Ironically, Evergreen flew helicopters for a quarter of a century—without receiving any publicity—to eradicate the black fly that causes blindness in seven African nations. Yet, the publicity that the company got for its humanitarian efforts doesn't begin to compare to that generated by the acquisition of the Spruce Goose.

"We took the blind count down from six million to 200,000 [people], and I don't think we have had two paragraphs of ink," Smith said. "There is some mystique about that airplane.

"We fly a lot of airplanes out of Asia, and [once I] had two hours to kill before our [Evergreen] 747 was to leave from Beijing. I decided to take our group to a hotel for lunch. Walked in there, and there was a Spruce Goose Lounge. It was owned by a retired pilot from Switzerland who always admired the Spruce Goose."

Despite worldwide respect, the Goose was booted from its quarters like a tenant who is late with the rent.

"Disney gave us six or eight weeks to get it out of there," Smith recalled. He had help disassembling the aircraft from many of the original workers who assembled the HK–1.

The Spruce Goose was then put on a barge and floated to Oregon in 1992. To avoid damage to the wings, they were hung in steel cages by their engine mounts. The aircraft was taken to within nine miles of McMinnville using state waterways, and then by road for the final journey to Evergreen headquarters.

Prior to the younger Smith's death in 1995, he had worked to build the museum by acquiring various examples of World War II aircraft. In the early 1990s, the aviation industry went through a recession, requiring a delay to gather the funding for the museum that is now nearly complete.

"That's just the bare box. We plan to add a theater and restaurant in the future," Smith said.

Set to open this spring, the museum promises to put McMinnville on the map as a must-see site for vacationing pilots from around the world. But Smith wants it to be much more.

"I want to get a space science program or some other learning program going, and have an exhibit that expresses appreciation to the old-timers. I want to help every kid that is in Scouts to get an aviation merit badge, and to work with the Civil Air Patrol. I am more interested in it being a learning institute than I am in a museum," Smith said. "I don't want this to be a big box with a lot of artifacts."

Michael Smith was a scholar of aerial warfare. It shows on the upper level of Delford Smith's home, where many of Michael's momentos are on display. For example, he made a ceiling fan from the nose and out-of-spec propeller from a Messerschmitt. His collection of aviation prints, many signed by pilots who participated in the historic events depicted, still hangs on the walls. His love of aviation now lives on in a museum that serves as a tribute not only to the Spruce Goose and World War II veterans, but also to the younger Smith's vision. □

Howard Hughes and His Flying Boat *is available for $19.95 plus shipping from the Capt. Michael King Smith Evergreen Aviation Educational Institute by calling 503/472-9361 or 888/977-7823. Proceeds from the sales will help fund the museum and the Spruce Goose. Links to additional information about the Spruce Goose can be found on AOPA Online (www. aopa.org/pilot/links.shtml). E-mail the author at alton.marsh@aopa.org.*