# The Wing Flies Again

An exquisitely restored 1940s Northrop flying wing is back in the air. It still looks like the shape of tomorrow. By Stuart F. Brown

The view from the pilot's seat: A classic, sky-blue 1940s Northrop logo graces the N9M-B's cockpit.

ABOUT 24 hours of flight time and 35 takeoffs and landings are in the log book, and the members of the Northrop N9M-B test crew are beginning to feel they understand their airplane's flying qualities. Chief pilot Don Lykins is putting the finishing touches on the official flight manual, and two other pilots have already been checked out in the bright yellow-and-blue craft.

This is the second rigorous flight-test program for the N9M-B. Why do things twice? To stay safe. The original testing took place in 1945, and those records are long lost. That was the year a team of engineers and craftsmen working under the leadership of aeronautical wizard Jack Northrop completed fabrication of the single-seat, all-wing plane—mostly from wood.

With World War II raging, aluminum was reserved for the fighters and bombers being cranked out by the thousands and sent into combat. Even the owner of Northrop Aircraft could scrounge only enough of the lightweight metal to fabricate the center section of his radical no-tail, no-fuselage, all-wing experimental aircraft.

For the past 12 years, a crew of volunteer fabricators and technicians has stolen Saturdays and other bits of free time to meet in a musty factory in the industrial sprawl of Los Angeles. There, under the tireless leadership of Ron Hackworth—who oversees maintenance and modern-

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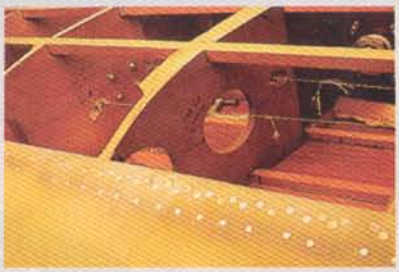

## Rebuilding the Wing

**N9M-B restoration volunteers work on the flying wing. The skin surfaces and intricate internal structures are mostly made of wood. Decayed wooden components (lower left) were replaced by hundreds of newly fabricated pieces.**

ization of McDonnell Douglas jetliners for a living—the volunteers resurrected the historic flying wing.

All sorts of people chipped in over the years, many of them affiliated with Southern California's aerospace industry. Rockwell engineer Keith Parker and his wife meticulously reworked the plane's hydraulic flight controls, which his father had originally designed and built. One restorer wasn't an airplane guy at all, but a weekend woodworker whose usual specialty was furniture. His expertise was essential to reviving lost wooden-aircraft fabricating methods.

The wing's power is provided by a pair of horizontally opposed, eight-cylinder Franklin "pancake" engines, which aren't easy to maintain. Only nine of these experimental powerplants were built by the long-defunct manufacturer. Luckily, someone tracked down a former Franklin technician, who dusted off his notebooks and helped sort out oil-leak glitches afflicting the oddball engines. Now they run reliably.

On visits to the workshop over the past three years, I watched the complex internal structures of the wooden outer-wing sections take shape. It was almost sad to see the wing skins finally applied and painted, because they hid the beautiful work within. Made from strong and expensive many-layered German plywood, the myriad pieces of the wing's skeleton were cut and fitted as finely as the body of a violin or an elite wooden racing sailboat.

For years, the N9M-B's neglected remains sat under the scorching Mojave Desert sun in an obscure corner of Edwards Air Force Base, looking like a formless pile of junk. Then Edward Maloney, founder of the Planes of Fame air museum in Chino, California, rescued them.

The plane was from a flock of four small experimental flying wings Northrop built and flew. Thirty years later, these flying wings influenced the design of the big, batlike B-2 stealth bombers seen traversing the same skies today. One of the wings crashed during a 1940s test flight; another is in the aircraft collection of the Smithsonian Institution in Washington, D.C.

Witnessing the restored N9M-B's second flight last November at Chino Airport was inspiring yet worrisome. After about 40 minutes of gentle maneuvers and flybys above a large and enchanted crowd, pilot Lykins radioed back something about mechanical problems and prepared for landing. As the wing touched down, observers were alarmed to see that neither of its pusher propellers was spinning. He was making a dead-stick landing.

"I was having trouble with the hydraulic governor," Lykins recalls, "which got the propeller blades stuck at an angle that made the engines almost useless, so I shut them down." A retired Delta Airlines captain with experience in dozens of different aircraft, Lykins collaborated

with experts at the Air Force Flight Test School at Edwards to develop a cautious and methodical flight-test schedule to rediscover the N9M-B's character.

"Before the first flight," he says, "we had calculated what I could safely do to get back down on the ground if anything went wrong. So when the problems happened, I had already gone over and over the possibilities with some magnificent aeronautical minds, and I had a Plan B and a Plan C to fall back on."

The Northrop flying wings were the product of Jack Northrop's fascination with the "span loader" concept [see "Megaplanes," April '95]. This design philosophy calls for an all-wing structure that provides both aerodynamic lift and packaging for the payload, spread over a large area. Northrop felt that such a plane would be lighter, smaller, and cheaper to build than a conventional wing-and-fuselage aircraft.

William Sears, professor emeritus of aeronautics at the University of Arizona in Tucson, was chief of aerodynamics and flight tests at Northrop Aircraft in the 1940s. The 60-foot wingspan N9M series were his and Jack Northrop's birds. They designed the single-seat planes for one purpose: cheaply and quickly simulating, at one-third scale, the flight behavior of a 180-foot-span experimental flying-wing bomber called the XB-35, which the military had commissioned Northrop to build. Sears calls this scale-model predictive method and the math equations that accompany it "dynamic similitude."

Restoration team leader Hackworth has now made a flight in the wing, as has another seasoned aviator with unique qualifications: Bruce Hinds, who was chief Northrop test pilot on the B-2 stealth bomber program for 9 years and made the first flight of that big, black flying wing. Hinds offers his impressions of the two flying wings conceived three decades apart: "These are forgiving airplanes, and it's the large wing area that does it," he observes. "They have a lot of lift, so a small pitch-up adjustment is all it takes to get airborne during takeoff. The big difference between the two airplanes, of course, is that the B-2 is computer-controlled, which gives it excellent directional stability. In the N9M-B, you have to make little yaw corrections to keep the nose pointed where you want it."

Flight tests back in the mid-40s were more casual, aerodynamicist Sears recalls. "Johnny Meyers, our chief test pilot, wanted me to go along on some of the N9-M flights. There was no room, so they made a little sideways chair for me to sit on with my knees to one side, and the back of Johnny's neck in my face.

"Coming back to land one day, we realized that the left main landing gear was stuck in the up position. Johnny wasn't worried. He descended so expertly that the plane was down to about 25 mph before the left wingtip scraped on the runway. We made a gentle spin and stopped right in front of Jack Northrop, who said, 'Bill, you really shouldn't be in there.' He was such a gentleman. I said, 'Jack, I'm only trying to do my job.'" ◆

## Northrop's Giant Wing

**B-49 flying-wing bombers lined up at the Northrop Hawthorne, California, plant in 1948. Politics have since doomed the 13 Northrop wings to the scrap heap.**

WHERE ARE NORTHROP'S B-49 flying wings today? Nowhere to be found. Even a grand tour of the world's great aircraft museums wouldn't yield a peek at one of the most interesting and imaginative flying machines ever built. All of them were melted down for scrap in an act of destruction that took laborers wielding axes and cutting torches three months to complete.

During World War II, Army Air Corps planners began to worry that if England fell to Hitler, long-range heavy bombers could be needed to attack Germany nonstop from bases on America's East Coast. Their optimistic goal was to develop a bomber capable of carrying 10,000 pounds of bombs 10,000 miles.

The promised efficiencies of Jack Northrop's flying wing attracted government funding. So did the B-36, a huge six-propeller conventional bomber conceived by Northrop's archrival, Consolidated Aircraft, in Fort Worth, Texas. Designer Northrop and aerodynamicist William Sears launched the 180-foot-span XB-35 prototype off the drawing board and into the sky with a quartet of pusher propellers powered by big radial-piston engines buried inside the thick wing-fuselage. All of the predictions about how the XB-35 would behave in flight had come from testing the one-third-scale N9Ms.

By the war's end, Northrop had installed eight compact turbojet engines in a version of the big wing called the B-49. Although the military initially ordered 30 reconnaissance models of the B-49, it later decided more speed was needed than the thick-winged plane could efficiently deliver.

Strategic Air Command founder General Curtis Lemay preferred the B-36, with its range of 9,000 miles carrying 10,000 pounds of bombs. The B-36 eventually sprouted four added-on turbojet engines, and served as the Air Force's long-range heavy bomber until the all-jet B-52 was introduced. Air Force Secretary Stuart Symington cancelled the B-49 flying wing program in 1949.—*S.F.B.*