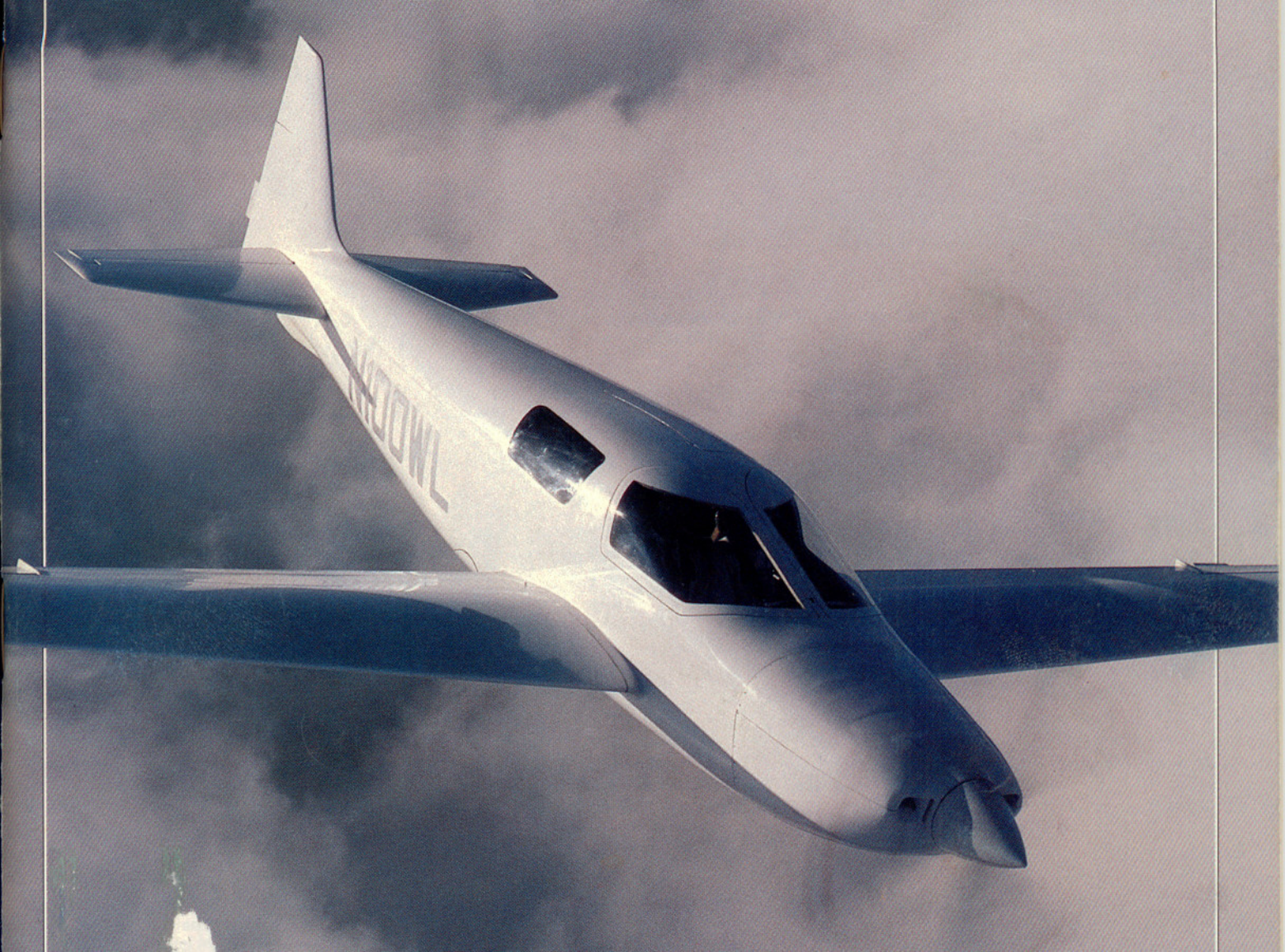

KITS

WHITE LIGHTNING

A kit airplane that gives factory-built four-placers a run for their money.

As some kit aircraft designers see it, investing in the development of a four-seat airplane is, at best, a long-odds gamble. They point to a used market already glutted with low-time, factory-built four-seaters, and ask: Why buy a kit, when, for the same amount of money, you can buy a comparable airplane ready-built? For a four-seat kit airplane to have any chance of success, they say, it must offer exceptional performance.

This analysis of the market is being put to the test by recent designs such as the Prescott Pusher (reviewed in the March *Pilot*, p. 98); the Velocity, a fiberglass, four-seat derivative of the Rutan Long-EZ, and the White Lightning, a fiberglass and carbon-fiber airplane designed by Howell C. (Nick) Jones Jr.

Of the three, the White Lightning offers cruise speeds far above those of normally-aspirated, four-seat production models. Powered by a 210-horsepower Continental IO-360, the airplane, at 75-percent power, outpaces the F33A Bonanza by 56 knots and the Mooney 205 by 55 knots. According to company figures, the White Lightning's 75-percent cruise speed at 8,500 feet is 226 knots. Top speed is reported to be 234 knots. No-reserve range at 75-percent power is 1,476 nm. Total standard fuel capacity for the White Lightning is 72 gallons.

High-performance airplanes have been Jones's passion for years. During the 1960s and 1970s, he flew in Formula One air races. In 1978, he founded the Lowers, Baker, Falck Competition (also known as the Oshkosh-Fond du Lac 500) to promote the development of fast and fuel-efficient general aviation designs. Since 1981 that competition has been won handily by A. J. Smith flying an airplane of his own design, the two-place AJ Special. The impetus for designing the White Lightning, says Jones, was to invigorate a competition that was merely filling Smith's trophy case. As design work progressed, Jones decided to develop an airplane that also would appeal to kit-aircraft builders.

In pursuit of speed, Jones designed the White Lightning with a small frontal area. Cabin width is one and a half inches narrower than a Mooney's. But the real sacrifice has been made in cabin height, which has been kept to a minimum along the length of the passenger compartment, in order to reduce the parasite drag of the fuselage. The ergonomic result is reduced headroom, requiring occupants to sit in semi-reclined seats. In the prototype, pilots with long torsos have bumped their heads on the top of the cabin. Jones commented that the geometry of the front seats is being modified to add two inches of headroom. Rear-seat passengers sit facing aft. This arrangement provides maximum headroom to those in back—allowing them to stretch out their legs—and minimizes the aft CG shift when the rear seats are occupied.

The long, shallow compound curves of the fuselage (which approximates the shape of a NACA 23-series airfoil) minimize airflow disruption and attendant drag. The airplane's "low mid-wing" configuration, to use Jones's term, reduces turbulent airflow at the wing root, eliminating the need for fairings around the wing/fuselage intersection. The wing section is a laminar flow NACA airfoil. A wide-span Fowler flap lowers stall speed from 78 knots clean to 60 knots in the landing configuration. The White Lightning's wood and fiberglass propeller is made by the West German firm of Hoffmann GmbH & Company KG. Jones is considering switching to an American-made propeller because Hoffmann's prices have increased substantially as the dollar has fallen and the Deutschemark has remained strong. For the forward-swept landing gear, Jones acknowledges that he borrowed heavily from the design of Edward J. Swearingen Jr.'s SX300.

As Jones explains it, Swearingen also contributed his "design philosophy" to the project. That philosophy is reflected mainly in the White Lightning's relatively small wing area and high wing loading of 27-pounds-per-square-foot, and also in attention to minimizing cooling air drag. Swearingen provided technical advice to Jones, but did not participate in design work for the White Lightning.

Construction techniques for the White Lightning are innovative. Rather than building the fuselage out of right- and left-hand halves, the White Lightning fuselage comes as top and bottom molded fiberglass shells. The top fuselage section is set in place only after most of the control linkages and other systems have been installed in the lower fu-

selage section. This provides easy access to these systems during the construction process. Bulkheads, main-gear attach points and a tubular carry-through spar are preinstalled in the bottom half of the fuselage, which reduces building time. The wing comes with many internal structures fastened into place. Jones estimates total construction time at 600 hours for an experienced builder.

For the airplane's flight tests, Jones has contracted with William P. Kelly, formerly a test pilot for the Navy and Piper Aircraft. Kelly will perform spin, controllability, dive and other flight tests. The airplane's projected design dive speed (the maximum speed for which the airplane has been designed to withstand aerodynamic forces and be free of flutter) is 326 KIAS. Redline will be established at 260 KIAS. Ground vibration flutter tests already have been conducted. As a result of the test findings, the rudder was mass balanced and the elevator's mass balance weight was increased. (Control surfaces are mass balanced by adding weight forward of their hinge lines.) Static load tests were conducted on the tubular carbon-fiber main spar up to six Gs. Mathematical extrapolations indicate that the airframe should withstand 12 Gs. In control response, harmony and sensitivity, the prototype White Lightning is nearly identical to the Swearingen SX300. There is a single, centrally mounted control column. Though its vertical stabilizer and rudder may appear relatively small for an airplane of its dimensions, N100WL's rudder authority is adequate.

The White Lightning has approach speeds comparable to the SX300 and requires the kind of proficiency that only can be gained by experience flying slippery, responsive, 200-knot-plus airplanes. Based on *AOPA Pilot* staff members' brief flying time in the airplane, our principal concern is that visibility from the front seats is more restricted than in most high-performance production singles.

Jones's company, the White Lightning Aircraft Corporation, is accepting $500 deposits for the White Lightning kit, which will include molded airframe parts, prefabricated metal parts, a stainless steel exhaust system, engine mounts and all hardware. Kit price has been set at $29,950. Optional items will include an auxiliary 10-gallon fuel tank, an electrical system kit, aircraft lighting, a propeller, engine baffling, a stamped instrument panel, an interior finishing kit and a tool kit.

Several deposits have been received, according to Jones, but he would not give a figure. Shipments of the kit are scheduled to begin in September 1986.—*J. Jefferson Miller*

ART DAVIS