



PROWLER

George Morse's slick new V-8 powered 2-seater that looks a little like a lot of the best of World War II's front line fighters.

by JACK COX

For a while I was beginning to think I was chasing a phantom of some sort at Oshkosh '86. It seemed that every time I ran across an acquaintance I would be greeted with something like:

"Hey, have you seen that little Spitfire — boy, is it neat!"

Or . . .

"Whatta you think of that little P-40 — isn't that **something!**"

Well . . . uh, no, I **hadn't** seen that little Spitfire . . . or that little P-40, or the Mustang or the Macchi . . . and I have to tell you I was getting concerned. It's my job to see all the homebuilts at Oshkosh each year and I religiously tour the entire parking area a couple of times

each day to be sure I don't miss anything . . . yet I hadn't seen any of the "super neat" scaled replicas everyone was raving about. What kind of will-o'-the-wisp airplanes were out there that I couldn't catch up to?

Then someone said the magic words . . . and the mystery was solved:

"Didja see that fantabulous lil' Spitfire with the V-8 engine?"

"V-8 engine" . . . aha! Then I knew — they were talking about George Morse's Prowler. **All** of them, those who thought it looked like a Spitfire, those who thought it resembled a P-40 . . . a Mustang . . . a Macchi . . . or whatever — **all** were talking about the same

airplane! I had seen the Prowler the previous year at Watsonville, CA and again last spring at Merced, CA and in both instances it seemed the airplane was some sort of memory mirror. Everyone who saw it saw something different . . . usually their favorite World War II era fighter, I found.

Just what manner of machine was this that pleased so many aesthetically. . . that impressed them so much with its design innovation and fine workmanship?

The Prowler airframe owes its very existence to its engine, a project George Morse has been working on since 1972. Called the Auto Aviation V-8,



by dual distributors. A wet sump lubrication system is used and the little V-8 is cooled by two underwing radiators (Cadillac/Corvette evaporators). Capable of handling 180 psi, the system has an 11 quart coolant capacity. Oil and coolant operating temperatures, often the bugaboo of auto engine conversions, have not been a problem in the Prowler. A recent change has been a switch to lower compression and larger valves . . . in anticipation of installing **two** turbochargers. George's accessory section contains no less than 11 different drives, running, among other things, **two** water pumps, the alternator and fuel pump.

At precisely 4,342 engine rpm and 2,600 prop revs, the engine is developing 250 horsepower, according to George's calculations. The total engine/accessory package weighs 420 pounds in the prototype.

Incidentally, you may hear the Prowler is powered "by an Offenhauser engine." The Olds V-8 is fitted with a set of after market valve covers with the name "Offenhauser" on them, which has led some observers to conclude that an alky burning Indy car 4-banger lurks within the cowling. No, no . . . no!

Years ago when George first got his V-8 powered Skybolt flying, he told me it was just a test bed for an airplane he hoped to eventually build. That airplane turned out to be the Prowler, of course. Of typical metal aircraft stressed skin, flush riveted construction, it contains no

fiberglass — even the highly compound curved cowling is metal, beaten out by hand for the prototype by an artisan named Jim Logan. Jim is one of those old school metal pounders in whose talented hands a sheet of aluminum is like soft plastic.

The wing is a 3-piece, 2-spar assembly with a span of 25 feet 4 inches. The wing root airfoil is a NACA 64A212 and this transitions to a 64A210 at the tip, which is washed out 3 degrees. The ribs were formed from .040 2024-O, then heat treated. The center section is 8 feet in span, which permits legal highway towing when the outer panels are removed. The wing leading edges are sealed internally to create fuel tanks. Including a fuselage mounted header tank, the total fuel capacity of the prototype is 35 gallons, but there is room in the wing to up that to about 60 gallons.

The tail surfaces are constructed much like the wing. The vertical fin is offset a half a degree to the left and the horizontal stabilizer has a half degree of negative incidence.

The ailerons and elevators are actuated by push rods and the rudder by cables.

The oval fuselage is built up using bulkheads, stringers and stressed skin. The cockpit seats two in tandem with the single instrument panel in front. Both seating positions have stick, rudder pedals, brakes and engine controls. As you can see in one of the accom-

it is a development of the aluminum block 215 Olds V-8 introduced by GM in the early 60s for its then new "compact" cars. Its most significant feature is a 1.67 to 1 geared reduction unit, with a unique "circulatory oil bath" of George's own design which he believes is key to its durability. He has been flying one of the engine/gearbox combinations for years . . . and about 330 hours . . . on the nose of his Skybolt, and in several tear-down inspections has found no visible sign of wear on the helical gears. At Oshkosh '86, the Prowler had been flown 167 hours and the engine/gearbox/3-blade McCauley constant speed prop combination had been performing like a champ, including the just completed flight east from George's base of operation at the Watsonville, CA airport.

Over the years, George has modified the basic 215 Olds engine, including such things as refitting it with a Buick 300 crankshaft that increases the displacement to 266 cubic inches. A Bendix PSH5-BD carburetor is used and each cylinder's single spark plug is fired

All Photos By
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panying photographs, the entire cockpit is sealed off from the rest of the fuselage with sheet metal. It is one of the cleanest 'pits I've ever seen on any kind of airplane, and painted a light color, there are no dark corners to hide errant screws, keys, coins, etc., that inevitably find their way onto cockpit floors. The airplane can be soloed from either seat, but George prefers the rear one, probably because he is accustomed to flying his Skybolt from back there where *real* pilots sit.

An 8 foot long bubble canopy from Gee Bee is hinged to swing up and to the right for access to the cockpit, and the windshield is fixed.

At this point I ask you to pause for a second and look at the Prowler's landing gear legs . . . obviously stock units off some factory job, right? Wrong! They are George Morse designed and built, utilizing only a few off-the-shelf items, like Cessna axles. Cleveland wheels and brakes, with 6:00x6 tires, are used and are "in scale" in appearance for the size of the airplane.

The retractable tailwheel combines a Scott wheel and fork with George's own retraction mechanism, hydraulically actuated as are the mains, the gear doors and the flaps. The inner doors for the mains are on a separate circuit and can be operated independently. You sharp eyed readers will no doubt notice that George was experiencing a minor glitch with his tail wheel doors during our air-to-air photo mission at Oshkosh '86.

Initially, George had a military style

tail wheel steering system — stick forward to unlock the tailwheel and allow it to swivel freely; stick back to engage it for steering through the rudder pedals. Once he began flying the airplane, he found it to be so easy to handle with differential braking only that he removed the locking system to save weight.

The Prowler prototype has an empty weight of 1362 pounds, a maximum take-off weight of 2,000 pounds, a wing area of 104 square feet and a wing loading of 19.23 pounds per square foot. At gross and with the engine cranking out

250 hp, the power loading is 8 pounds per horsepower. The design dive speed is 250 mph CAS and the redline is 275. The flaps can be safely lowered at 150 mph, the gear at 125. Top speed at sea level is 220 mph and the initial rate of climb is about 2200 mph.

It took George three years of full time work to design and build the Prowler prototype. The first flight was on March 17, 1985 at the Watsonville, CA airport. From the start, he has been pleasantly surprised with the airplane's handling — nice and solid, he says, and hands off in calm air. On the trip east to Oshkosh



last summer the Olds V-8 hauled the Prowler along at groundspeeds as high as 225 mph, burning about 10 gallons per hour.

When the Prowler landed at Oshkosh, both the airplane and its designer were new on the scene for probably the majority of EAA members. Actually, however, George Morse has been coming to Oshkosh for years. He's such a low key, modest sort of fellow, however, that it took something as spectacular as the Prowler to make him stand out in the crowd at Wittman Field. He brought the first component of what would ultimately evolve into the Prowler to Oshkosh in 1974, as a matter of fact, driving from California in a little pick-up with his V-8 conversion mounted back on the bed.

He spent the week running it for the great number of EAAers who were interested and amazed one and all with the small V-8's willingness to pull the big constant speed propeller he was using as a test club.

George Morse was born in the high country of western Colorado, in the town of Delta, but grew up in California where his parents had moved before he was ten. He served a 7 year hitch in the Air Force, and subsequently spent a similar period in the radio and TV repair business. In 1952 he and his wife, Kathleen, moved to the Santa Cruz area and raised five children in the years that followed. In the early '60s he became the parts manager for an Oldsmobile dealer, and it was there that he became aware of the potential of combining various off-the-shelf GM parts and pieces . . . crankshafts, cams, gear sets . . . to create a version of the small aluminum block V-8s then coming onto the automotive scene, plus a reduction gearbox, that would be suitable for use in

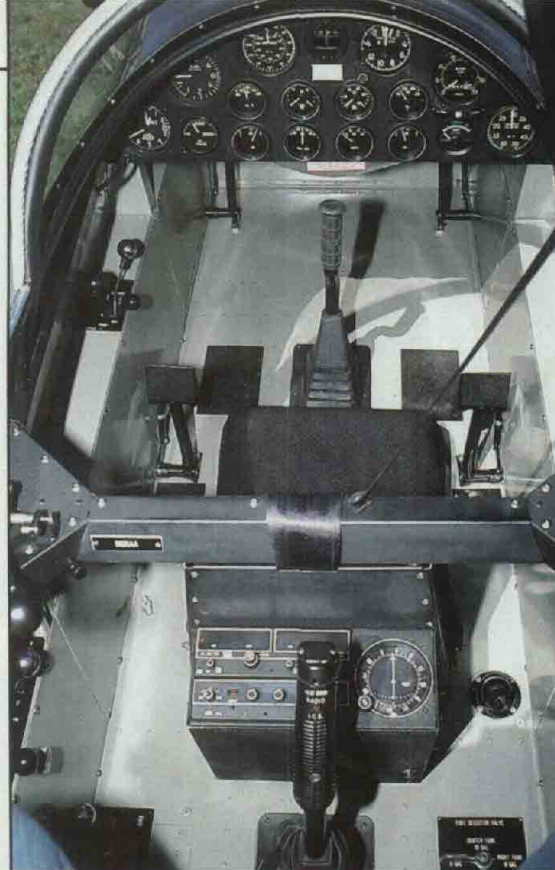
airplanes.

George had always been interested in aviation, but had to content himself building models until, in 1967, his family obligations were such that he felt he could justify learning to fly. After developing his aircraft version of the 215 Olds, he went into business for himself and, over the years, has built up 13 of them for sale to others. Currently, he is working on a similar conversion of the 350 Chevy engine — or, more precisely, a racing version of that engine. Starting with the Rodeck aftermarket block used in race cars, George will select internal moving parts from the best of production car and racing parts bins to adapt the engine to aircraft operation.

It will crank out 350 hp and George thinks it will go forever between overhauls, but the initial price won't be cheap. He figures it will have to cost about \$15,000 . . . which is still a lot less than what you have to pay for 350 horsepower from Continental or Lycoming. The 215 Olds conversion will continue to be available even after the Chevy is developed so that Prowler builders can have a less expensive option. The prop currently on the airplane, incidentally, is a 3-blade unit normally used on the Cessna 206. The 3-blade McCauley used on the P-210 has been identified as a good selection for the 350 Chevy.

In late February, George told **Sport Aviation** that aerobatic pilot Wayne Handley had flight tested the airplane to $+6 \pm 3$ Gs and likely will fly an airshow routine in it at Watsonville, CA over the Memorial Day weekend and, possibly, again at the Merced Fly-In a couple of weeks later. George had logged about 200 hours in the 2 year old

George Morse



airplane at that time.

At this point, George believes Prowler kits are at least a year away. He wants to develop a very complete kit, including engine, prop and avionics, and that takes time and a considerable amount of up front resources. At the moment, he has separate information kits on the Auto Aviation V-8 and the Prowler for \$12.50 each, and a video tape on the Prowler should be available by the time you are reading this for \$24.95. A new company has been formed to market the info packets and kits: Prowler Aviation Corporation, 160 Aviation Way, Watsonville, CA 95076.

