



# Airframe soup-up

Making the Six look,  
and fly, faster

BY THOMAS A. HORNE

**I**n the plodding, step-by-step, day-by-day world of a total aircraft refurbishment, time expands and contracts. For the longest stretches, nothing seems to happen. Then, seemingly overnight, you see significant progress. So it was with the Win a

Six in '06's engine overhaul. Months went by, and then suddenly I was in Mena, Arkansas, flying the Win a Six to LoPresti Speed Merchants at the Vero Beach, Florida, municipal airport. There, Curt LoPresti, president of LoPresti Speed Merchants, would oversee the airframe upgrades to this year's AOPA sweepstakes airplane.

The process began with the removal of the original cowlings and wheel pants. They were replaced with new components designed by LoPresti and recently introduced to the Cherokee Six market. It's been a busy time at LoPresti Speed Merchants, what with the rollout of these new modifications and the search for a manufacturing site for

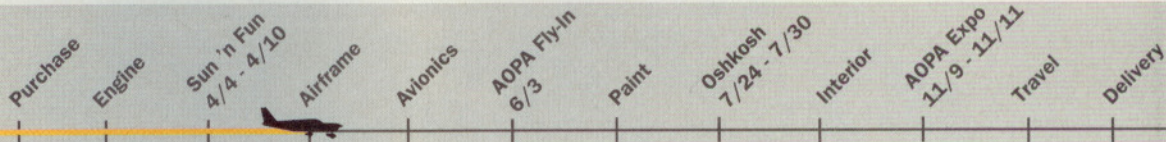
LoPresti's SwiftFury, now renamed simply the Fury. The Fury—based on the popular Swift series of low-wing, high-performance tailwheel airplanes built in the late 1940s—took off with a bang in 1988, then was put on hold a few years later. Now, funding is being secured for the Fury's production.

By the time I delivered the Win a Six to Vero Beach, LoPresti's new Cherokee Six cowling had been installed in just one previous Six—also a 260-horsepower, carbureted-engine model.

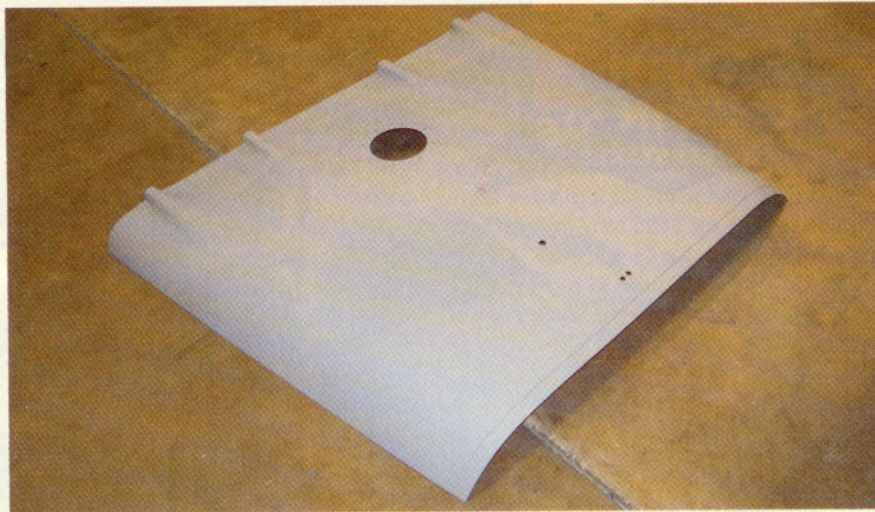
## Design details: cowlings

The LoPresti cowlings are much more than a simple, firewall-forward, bolt-on affair. The assembly includes a belly fairing as well as a windshield fairing. When the modification is completed, you can easily see that the work encompasses installations that go as far back as the fuselage station formed by the leading edge of the wing.

## Project Timeline







LoPresti's belly fairing (left) is part of the cowl assembly, and helps smooth airflows past the fuselage. Wheel pants (below) have strut fairings for best drag reduction.



Of course, the cowlings' air intakes have the signature, small-circular design that distinguishes all the LoPresti cowl mods. Although it may seem counterintuitive to optimal cylinder head cooling, those small inlets actually increase the velocity and volume of air traveling through the engine compartment (see "Airframe & Powerplant: Air-Cooling Primer," page 137). There are two inlets that admit cooling air for the cylinders; another separate circular inlet sends ram air to the engine's in-

duction air plumbing, and on to the carburetor.

The sides of the cowlings feature large, hinged access panels that give you a good look at the cylinders and the rest of the upper portions of the engine. The access panels are secured by cam-lock screws that open with a half-turn of a Phillips head screwdriver. This setup sure beats the stock Piper cowlings, which only have an oil filler door. With a stock cowlings, you have to remove the entire top half of the cowlings to get a

decent preflight look at the engine. And that top half is a huge, curved slab of fiberglass, just waiting to be blown out of your hands on a windy day.

By the way, the LoPresti cowl and wheel pants on the Win a Six are made of carbon fiber, not fiberglass. This gives them more strength, durability, and crack resistance than the stock components.

The cowlings also comes with a single giant cowl flap; the stock cowlings has a fixed opening. The cowlings fits rather



The one-piece windshield, designed by Kosola and Associates and provided by LP Aero Plastics, comes with a protective coating. The original two-piece windshield was tossed out, along with its center post. The new windshield has a slimmer post, and better visibility.



tightly to the engine, so for good cooling during ground operations and climbs on hot days, you have to open the cowl flap wide. You do this by means of a T-handle on the instrument subpanel. The cowl flap can be set to an infinite number of positions; there are no detents. Just turn the T-handle to the left to free up the friction lock, and pull to close the cowl flap, or push to open it. After moving the handle, turn it to the right to lock the cowl flap's mechanical linkage in place.

An exit chute on the underside of the right half of the cowling allows another large volume of air to flow through the

engine compartment. The chute has an area of 80 square inches.

LoPresti calls the windshield element of its cowl assembly the "windshield wedge." It sweeps upward from front to rear, and in flight this design reduces the low-pressure area that lives immediately in front of the lower portions of the windshield.

The belly fairing covers the forward belly strakes. While the strakes provide strength to the Cherokee Six's fuselage, they also cause air flow separation, which in turn causes drag. As with all the other LoPresti mods, the design goal of the belly fairing is to re-

duce this drag and foster incremental increases in cruise speed.

### **Wheel pants, and more**

The Win a Six is also equipped with LoPresti's new wheel pants, specially designed for the Cherokee Six. These may look bulbous, but in fact their size and shape are more aerodynamic than the stock pants. I especially welcomed the departure of the stock nosewheel pant, with its dated, art-deco-style tail fin.

The new nosewheel pant, like those for the main gear, is of a two-piece construction. Front and back halves bolt together. This makes wheel and brake maintenance easy. To perform brake or wheel maintenance with the stock nosewheel pant you have to jack up the nose, take the axle out of the nosewheel fork, remove the wheel, then raise the fairing and turn it 90 degrees so that you can slide it down off the fork. With the LoPresti nosewheel pant, you simply remove the back half of the fairing.

With all the LoPresti wheel fairings, there's plenty of room to reach up and access the tire valves—without disassembling the wheel pants.

Flap hinge fairings (LoPresti calls them "Speed Splitters") and flap gap



seals round out the speed mods. The splitters smooth the air moving past the flap hinges. The gap seals prevent drag-producing air flows through the gap between the wing trailing edge and the flap leading edge.

The Win a Six inherited some other aerodynamic mods. A Knots 2U wing-to-fuselage fairing was installed by a previous owner, and so were Knots 2U's aileron gap seals.

### **The numbers, please**

So what kind of speed improvements can we expect from the LoPresti mods? The company says that the cowl will reduce enough drag to boost maximum cruise speeds by 8 mph/7 knots. The wheel pants should add another 8 mph/7 knots. The flap hinge fairings and gap seals each up speeds by 3 mph/2.5 knots.

That adds up to a 19-knot hike in max cruise speed at optimum altitudes (the 5,000- to 8,000-foot pressure altitude range). That's a pretty impressive claim!

But there's more to factor into the equation. The engine overhaul performed by Ultimate Engines resulted in measurable power—and therefore, air-speed—gains. Before the overhaul, the

highest cruise true airspeed I saw came in at 136 knots. That was at a 75-percent cruise power setting at a 5,500-foot pressure altitude, with an outside air temperature (OAT) of 20 degrees Celsius. After the overhaul—and before the LoPresti mods were added—that number went up to 141 knots. So it appears the overhaul bolted some five knots to 75-percent cruise speeds. Add the 22 mph/19 knots increase promised by LoPresti, and it looks, at first glance, like we could have cruise speeds as high as 160 knots.

### **Sun 'n Fun**

After the speed mods were installed, my next stop would be the Lakeland-Linder Airport in Lakeland, Florida. There, the airplane went on display at the Sun 'n Fun fly-in, in front of AOPA's Big Yellow Tent. It drew quite a crowd, and the speed mods, great-looking detail work on the engine, and interior display all brought scads of favorable comments.

Jimmy Jones, of Aircraft Interiors of Memphis—our interior designer and installer—brought a finished seat so that visitors could get a glimpse of what the interior would look like in a few months. It was done up in grey leather, with yellow accent piping.

During Sun 'n Fun, several project contributors came by each day to give brief informal talks about the nature and extent of the improvements they made to the Win a Six. These included Harold Kosola of Kosola and Associates (engine mount inspection and repair); Michael Feldbauer of Sennheiser (HMEC450 and HME110 noise-canceling headsets); Tyson Tucker of Vantage Plane Plastics (interior plastic components); Ed Salmeron of ECi (a set of six Titan cylinder assemblies); George Mazarek of LP Aero Plastics (one-piece windshield); Dick Guenther of Dial Eastern States Aircraft Painting Inc. (application of aircraft paint); Craig Barnett of Scheme Designers (creators of the paint scheme); Tom Harper of Avidyne (contributors of a FlightMax EX500 multifunction display, with traffic and weather); Curt LoPresti of LoPresti Speed Merchants; Bob Honig of American Propeller Service (Designer\*Prop propeller paint job); Steve Carter of Unison Industries (Lasar ignition system); Jimmy Jones of Aircraft Interiors of Memphis; and Dave Gustafson, representing Aircraft Spruce & Specialty Co. (Windjammer motorized bicycles).

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A note about those motorized bikes: Man, are they fun to ride! I rode one all over the Sun 'n Fun grounds (at least, all the places that security would let me), and I think anyone who rides one will be hooked. I let several visitors to the Six take the Windjammer for a spin, and adventure was in the air. Just remember, Win a Six winner, pedal hard to move off from a dead stop or climb a hill. And don't forget that its tiny engine uses two-stroke fuel. Aircraft Spruce says the Windjammer will do 25 mph on a level surface, and I believe them (see "Pilot Products," May *Pilot*).

### The new, one-piece windshield

After Sun 'n Fun, it was back to LoPresti's shop for installation of LP Aero Plastics' one-piece windshield. This was a three-day job, but it was worth the wait. Visibility out the brand-new window is great. LoPresti mechanics Rick Wisniewski and Steve VanAntwerp went to work on the air box, too, so that more heated air would flow through the carburetor with the application of carburetor heat.

### On to Muncie

With that work package finished, I headed out for the avionics shop at Muncie

Aviation Company at Muncie, Indiana's Delaware County-Johnson Field. It was a day-long trip, with good weather, but nasty headwinds for most of the way.

The leg from Vero Beach to the Athens/Ben Epps Field in Athens, Georgia, took 3.7 hours. And the cruise speeds? At 4,500 feet, true airspeed worked out to be 147 knots over the Jacksonville, Florida, area. Not as much as the promised 160 knots, but then again the airplane is by no means finished, and I had to back off a couple of inches of manifold pressure from the 75-percent power setting to keep two hot-running cylinders (the number-three and number-four) under control. The cowlings will be tweaked to deliver more cooling airflow past those two middle cylinders. And the pitot-static system will be inspected, tested, repaired, and recalibrated as necessary at Muncie. Our airspeed readings should be more accurate afterwards. We'll have a better handle on the airplane's performance numbers as the project advances.

After another 2.7 hours in the saddle, another fuel stop was made at the Louisville, Kentucky, International-Standiford Field, and the last leg was an easy 1.2 hours to Muncie.

Now begins the most ambitious of all of the Win a Six's massive work packages. As I write this, Muncie Aviation's avionics crew, under the supervision of Bill Roundtree, has just gutted the old panel. It's a frightful sight right now, with wires hanging down everywhere and a salvage-yard look. But within a month the new panel will rise from the ashes and go on display for the first time at AOPA's Open House and Fly-In.

The fly-in takes place June 3, at AOPA headquarters at the Frederick, Maryland, municipal airport. I'll be there to show off the airplane's latest improvements, and so will many of the companies that have so generously contributed to the Win a Six project. See you there! In the meantime, be sure to check AOPA Online for the latest photos, video clips, and other updates on the Six's progress ([www.aopa.org/sweeps](http://www.aopa.org/sweeps)).

**i** Links to additional information about the Win A Six in '06 Sweepstakes may be found on AOPA Online ([www.aopa.org/pilot/links.shtml](http://www.aopa.org/pilot/links.shtml)).

**AOPA**

*E-mail the author at [tom.horne@aopa.org](mailto:tom.horne@aopa.org).*