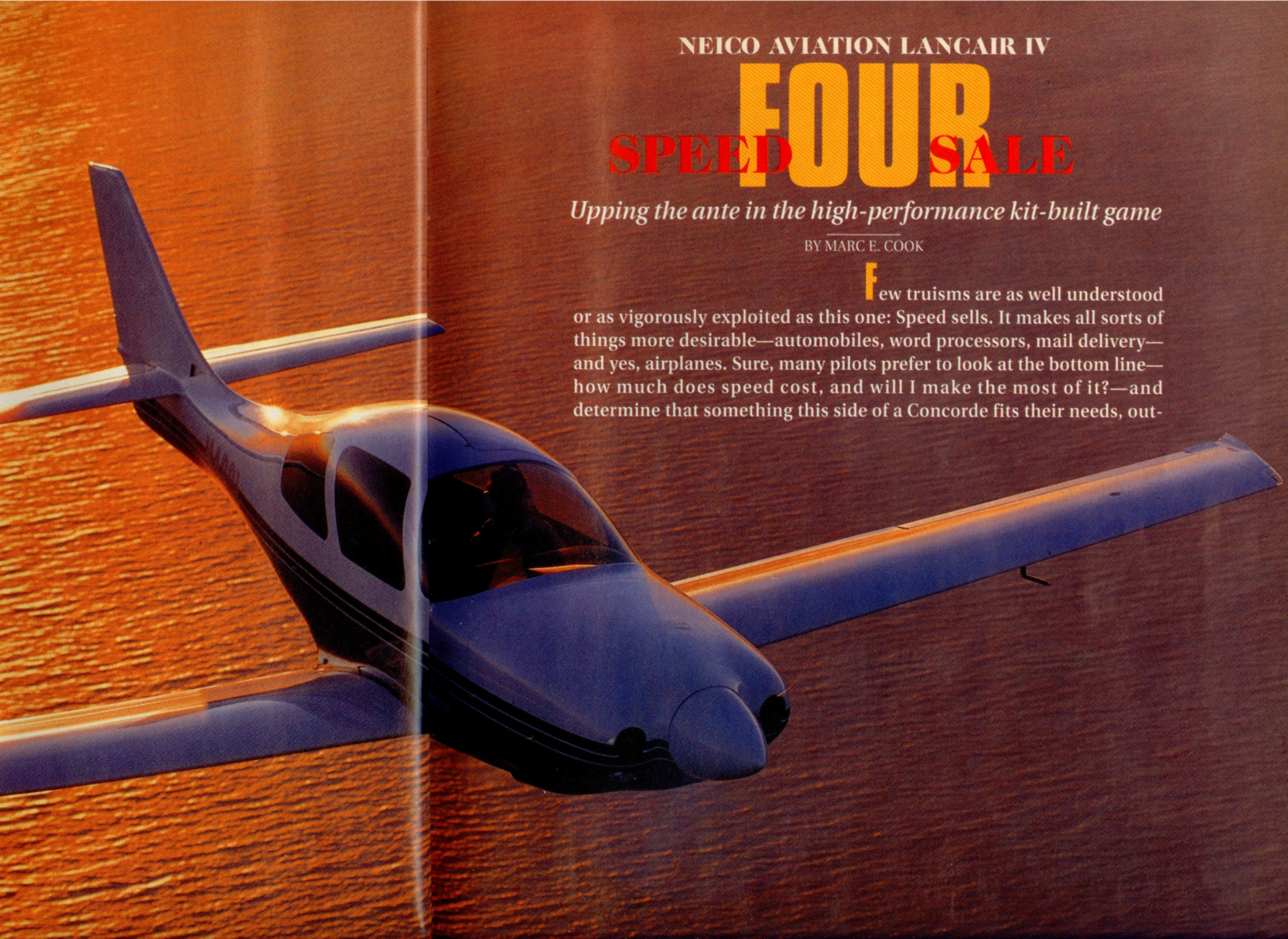


NEICO AVIATION LANCAIR IV

SPEED FOUR SALE

Upping the ante in the high-performance kit-built game

BY MARC E. COOK

Few truisms are as well understood or as vigorously exploited as this one: Speed sells. It makes all sorts of things more desirable—automobiles, word processors, mail delivery—and yes, airplanes. Sure, many pilots prefer to look at the bottom line—how much does speed cost, and will I make the most of it?—and determine that something this side of a Concorde fits their needs, out-

right speed be damned. They are perfectly happy banging along subsonically, enjoying the ride.

And then there are those for whom sheer speed is not just a desirable trait—it is the only desirable trait. Nothing short of the fastest airplane will do—within certain limits of reason, of course, as SR–71s are a bit scarce these days. The Neico Aviation Lancair IV is designed for just these speed-crazed souls. With a published top speed of 313 knots—or 360 in miles per hour, the unit of measure chosen by virtually all kit-built manufacturers to bolster the impressiveness quotient—and ear-popping rates of climb, the IV is the clear heir to the speed throne among high-performance homebuilts. It is not just a minor evolutionary step in speed compared to the previous class leaders, the Questair Venture and Glasair III, but a major stride forward. The Lancair IV has proved itself worthy of the record books, too, having set a National Aeronautic Association city-to-city record by speeding from San Francisco to Denver at an average groundspeed of 314 knots.

How the Lancair IV has leapt to the front of the field is really a simple matter—small airframe and large engine—gone about with a healthy dollop of technology. The airframe is largely carbon fiber and Kevlar and employs a laminar flow airfoil and long-span Fowler flaps. Wing area is a mere 98 square feet—less than 60 percent of a Piper Malibu Mirage's and just more than half of a 325-horsepower Cessna T–210R's—and the engine in the nose of the prototype can make 350 hp well into the flight levels. Look at these specifications—in concert with a maximum gross weight of just 2,900 pounds, which compares to 4,300 lb in the Malibu and 4,100 lb in the 210—and you can see where the performance comes from.

Comparisons with the Malibu and Centurion are unfair, of course, because the Lancair IV is not nearly as large as those six-place brutes. In addition to light weight and a diminutive wing, its relatively small wetted area and the factory's attention to aerodynamic detail help give the IV a substantial speed advantage—295 knots at high cruise at 24,000 feet next to the Malibu's 224 knots and the Cessna's 209 knots. Finding a kindred modern production four-placer with as much

power as the IV is impossible; the closest you might come is the normally aspirated 400-hp Comanche 400.

Aesthetically, the IV is a winner, with a sleek yet substantial appearance and a detail finish that puts even some very expensive production airplanes to shame. To some eyes, the Lancair IV looks like a Navion or Meyers 200 put through a rock tumbler and worn as smooth as a month-old soap bar. That the IV is related to the two-place Lancair 320 and 360 models also is evident. Next to the tiny wing, the cabin could have appeared bulbous, but it somehow does not; all in all, the IV is a pleasure to view.

It's a pleasure to fly in, as well, because inside that seductive shape is enough room for you and three friends. In the front row, there's space enough for there to be a small aisle between the pilot and copilot seats. Neico claims a cabin width of 46 inches—better than a Bonanza or 210—and a cabin height of 48 inches, the same as the Cessna. In the factory demonstrator, the front seats, though having low backs, are quite comfortable and supportive. Move back a row, and the cabin squeezes inward; although we didn't spend any time in back, it should be reasonably comfortable for anyone not an NFL fullback or NBA all-star.

You enter that cabin through a single left-side door; at least the pilot can make sure it is latched without embarrassing the right-seat passenger, unlike in most low-wing singles. You look out of the cabin through large, wraparound windows. Visibility is excellent in all directions, better than virtually all production airplanes—it even rivals that of canopy-equipped airplanes. So much glass gives the cockpit an airy quality, which works to make the cabin seem larger than it is.

Instrument-panel real estate is in excellent supply in the IV, which should allow builders to splurge on an avionics package and not wonder where it's all going to fit. The demonstrator had a modest sampling of radios, and the panel appears it will hold much more without a great deal of reshuffling. Sidewall-mounted control sticks help here, because they don't take up panel space as would standard yokes, and they don't steal lap room as would sticks.

Although it first seems the side sticks would feel strange compared to standard sticks or yokes, a bit of time will have you singing their praises. A thickly padded armrest provides a comfortable perch for your elbow. Engine controls are grouped in the center, below the radios, and are bracketed by electric three-axis trim above and a two-position (left/right) fuel tank selector below. In all, the Lancair IV is an ergonomic success, with everything within easy reach.

The cabin is roomy and well laid out and can haul a decent load, too. With an as-tested useful load of 1,102 lb, there's enough payload with a full load of fuel (77.5 gallons, or 455 lb) to carry three FAA-standard-sized souls and 137 lb of baggage. The factory prototype, at 1,798 lb empty, is 48 lb heavier than Neico expects finished customer kits to be—although empty weights tend to be all over the board in homebuilts, partly because of varying builder competence.

Systems management in the Lancair IV proves simple. The slotted flaps are electrically driven, via a small switch to the left of the throttle quadrant, and the electrohydraulic landing gear has its controls at the top center of the radio stack. That gear, by the way, gained its Cessna-like configuration because there simply was no room left in the wing for landing gear and enough fuel to give the IV some utility. As it is, the 77.5-gallon fuel ca-

pacity isn't overly generous with an engine that can burn almost 20 gallons per hour at maximum cruise speed; a Malibu carries 120 gallons. As in post-1978 210s and most other retractable Cessnas, there are no gear doors for the main wheels on the Lancair IV, only small, thin strips that cover the slot the main gear legs fit into when retracted.

Another systems plus—at least from a pilot-work-load point of view—is a lack of cowl flaps. Piper went this route with both Continental and Lycoming versions of the Malibu with limited success; historically, turbocharged engines packaged without cowl flaps have had problems staying cool in summertime, maximum-performance climbs. We didn't fly the Lancair IV in the summer, but even with maximum continuous power coming from the Teledyne Continental Motors TSIO-550-A, engine temperatures remained in the middle of the green arc. The company redesigned the cooling-air outlets early in the testing program to alleviate overheating problems.

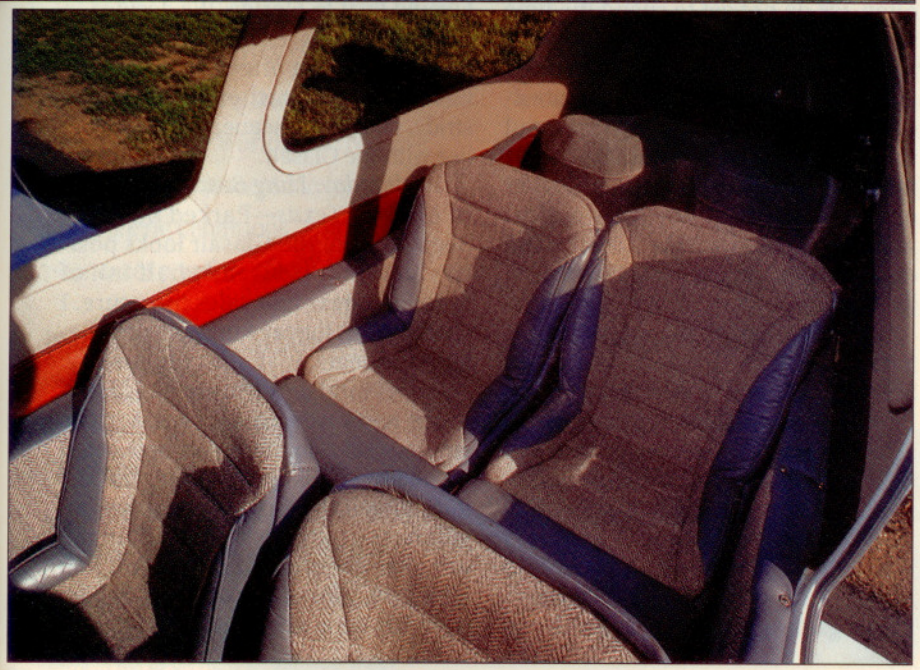
The Lancair IV's engine model might not sound familiar to those who follow Continental engines. Neico had TCM put together something of a hybrid. The twin turbochargers and intercoolers and tuned intake system are very similar to the original Malibu's, mated to the heavy bottom and larger cylinders of the IO-550. Automatic wastegates are part of this package, and the system worked seamlessly during our time with the airplane. The normally aspirated IO-550 from which the Lancair IV's is derived (and which is currently used in the A36 Bonanza) makes 300 hp at 2,700 rpm, so tuning it to make an additional 50 hp shouldn't push it to the very edge of reliability. Critical altitude of the turbo system is said to be above 24,000 feet. The engine mates with a 76-inch MT propeller, which is a made-in-Germany, composite-over-wood-core lightweight.

A total of 350 turbocharged horsepower provides ample motivation for the light Lancair. Initial takeoff roll is spirited, to say the least, so much so that you cannot slam the throttle to the fire wall without the airplane heading for the left-side runway lights with vigor. Rotation speed, about 75 knots, comes and goes rapidly, and soon, with the airplane cleaned up, at a climb speed of 120 knots, the vertical speed indicator shows a 3,000-fpm climb. With two aboard and about 40 gallons of fuel, the IV is eager to ascend. Unfortunately, there's little to see but the nose of the airplane at that climb speed; at 155 knots indicated, the airplane still shoots up at better than 2,000 fpm and provides a forward view of something besides fiberglass.

We perform brief cruise-speed checks and find that the demonstrator airplane performs pretty much as advertised. Set to 75-percent power and 12,500 feet, the airplane indicated 208 knots on a slightly colder than standard day, for a true of 250 knots; Neico claims 295 knots at 24,000 feet. Fuel

flow runs around 19.5 gph at 75 percent, for a 3.5-hour endurance with an hour's reserve. No-wind range at 12,000 feet should be better than 950 nautical miles; run it up to 24,000 feet, and you could go farther than 1,030 nm with no wind.

As well as the airplane ascends, it frankly does not come down well. This seems to be a primary shortcoming of the current crop of high-performance homebuilts, exacerbated by ridiculously low gear- and flap-extension speeds. (In the Lancair IV, they are 122 knots and 132 knots, respectively.) Although one could argue that it is too difficult to design gear (and gear doors) that can handle the high air loads that would be imposed at higher indicated speeds, this ignores the operational shortcomings. Neico is working on speed brakes for the IV—they would be a welcome addition and should be considered a mandatory purchase for builders.



Power pulled back, the IV reluctantly descends. The air is quite choppy the afternoon we have with the IV, but the airplane handles it well. Pitch stability is good, about like a Bonanza, and roll is a bit heavier. Overall, it seems a good balance of weighty control pressure to plentiful authority.

We decide to try some power-off stalls on the way down and find a distinct wing drop—it is too bumpy to get a good handle on the stall speeds, but the factory states that they are 70 knots clean and 60 knots in the landing configuration. Because spin testing remains on the horizon for the company, we just let the airplane nibble at the stall.

Coming into the pattern, with the gear and the first 10 degrees of flaps out, the IV requires considerable power to maintain altitude. Though it's light for the horsepower, you cannot forget about the IV's high wing- and low power loading. Fly the pattern at 100 knots or better, slowing to 90 on final. Pull too much power off, and it will sink rapidly. Landings ask for a bit of power all the way into ground effect and a modest pitch-up. Too much speed and it will float like a Mooney, too vigorous a flare and the airplane will plop onto the runway in a decidedly indelicate manner.

It's during touch and goes that you are most strenuously reminded of the big engine and prop connected to a smallish airframe. Adding full power on the runway calls for full right rudder, some right stick, and a concerted forward pressure on the stick. Most production airplanes have their engines canted relative to the airframe centerline to partly ameliorate this characteristic; the IV's engine is square in the airframe, and it shows. What's more, you will find yourself frequently trimming the IV in all three axes with every power and configuration change, once again a demonstration of the big engine/small airplane trade-offs.

To call the Lancair IV demanding to fly might be overstating the case. The compromises inherent in making an airplane fast all but guarantee that it

gross weight of 2,400 pounds and about two thirds of the way back into the center of gravity limits.

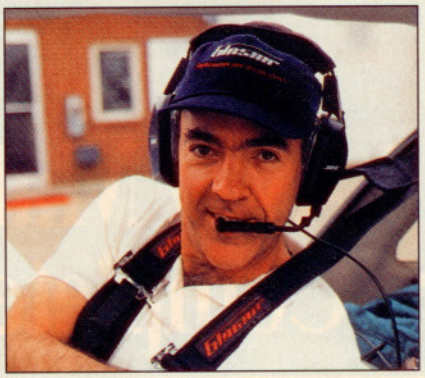
Sprague supervises fueling of the airplane, and with a weather briefing obtained, we clamber aboard. It's a tight fit compared to production airframes, including Mooneys, and the semireclining seats require a moment of acclimatization. I see right away that my size-11 Reeboks are going to fight with the rudder pedals for space, and I cannot apply full rudder without activating the toe brakes. Unfortunately, I won't discover a cure for this until halfway through the second day of travel.

Enough complaining. When that throaty 300-horsepower Lycoming comes on line to propel such a light, slippery airplane skyward, ergonomic glitches fade from concern—at least momentarily. Performance could be summed up in two relationships, wing- and power loading. The Glasair III, like its high-performance competitors, makes the most of both: Power loading is 8 pounds per horsepower, and wing loading is an eye-opening 29.5 pounds per square foot of wing. (Compare that to an F33A Bonanza, which has 11.9 lb/hp and 18.8 lb/sq foot, respectively.)

No wonder the airplane climbs enthusiastically. With full throttle and 2,500 rpm, 130 knots indicated, 1,400 fpm, and 28 gph, the airplane settles down to a comfortable cruise-climb.

In the first few minutes of flight, I am continuously reminded that the Glasair demands a light touch. I begin to wonder if hand-flying it all the way to Lakeland—the autopilot installed has not been properly calibrated, and so is virtually useless—will turn me into a twitchy nervous wreck. Sprague

Fueling the Glasair; Bill Sprague of Stoddard-Hamilton (below).



and I thump through light turbulence over Banning, California. Well, it feels light to us, although several other airplanes report moderate to occasionally severe turbulence at our altitude.

Level at 9,500 feet, well above where the III turns in its best cruise numbers, we let it stabilize out to 210 knots true. The Lycoming is loafing at full throttle (19 inches) and 2,300 rpm, burning 15 gph. We have about 2.3 hours left to empty tanks. Our first stop, Falcon Field, north of Phoenix, lies 325 nm from Long Beach.

The Glasair's seating position proves surprisingly comfortable, more so with every passing mile. But the rudder pedals are in precisely the wrong place for my feet, and I can't squirm around enough to get them clear of the pedals. In no time, one foot, then the other, falls asleep.

Crystalline blue skies greet us in Phoenix, and less than 90 minutes after liftoff, approach control is issuing vectors and descent clearances. Here a fast, slippery airplane conspires to make life difficult for its pilot. No speed brakes are installed on the III, and it sure could use them. We pull off a lot of power and inch the airplane to its 243-knot V_{NO}, top of the green arc on the airspeed indicator.

Coming down and decelerating in this airplane are a real challenge, made all the more so by absurdly low gear- and flap-extension speeds of 122 and 104 knots, respectively. Sprague recommends a procedure that, were it not for the Lycoming's nearly bulletproof reputation, would seem insane: Pull the throttle almost back to idle, run the prop to the fire wall, and let that big six-cylinder engine and 80-inch propeller, howling now at 2,700 rpm, be your speed brakes. When the airspeed decays, drop the gear—trim, trim, trim—and then get all the flaps out at once—trim, trim, trim—and come in with plenty of power to keep the airplane from sinking like a raft full of adobe. Approaches are at 95 knots with everything hanging out.

My landings for the trip would range from "You didn't break anything," to "Ahh, a carrier landing, eh?" With time, regular squeakers might be the rule, but the III does not flatter the pilot like a Bonanza—or even the II-S, for that matter. Enroute from Phoenix to El Paso, Texas, I have time to ponder the landing techniques; it helps, if only marginally, in El Paso.

Thursday. El Paso to Fredericksburg, Texas, to Baton Rouge, Louisiana—Spring weather has left western Texas with clear skies, but in Fredericksburg, our next stop, there are scattered to broken layers and a chance of widely scattered thunderstorms. No Stormscope graces the panel of N540RG, so we endeavor to keep our eyes open and our wits about us. So far, we have seen no thrilling groundspeed readouts—200 knots seems to be the nice, round average, although the evening before, on approach to El Paso, we'd

joked with the controller that we'll try not to run down the Boeing 737 on the visual in front of us. "Well, okay," he'd said suspiciously, "but you're showing the same groundspeed." Sprague broke into a campaign-winning smile.

This is the leg on which we—as they say in car racing circles—cob the sucker. On an IFR flight plan at 5,000 feet, with the throttle wide open and the Lycoming spinning 2,400 rpm, the III trots to 232 knots true at a tad under 19 gph—we are, of course, asking for almost 80-percent power from the engine. We scoot to Fredericksburg at a block-to-block speed of 217 knots.

Enroute, we encounter a bit of actual, mostly slamming through the tops of building cumulus. I am amazed that the airplane is so forgiving on the gauges. The normal thumps and up- and downdrafts seem to affect the airplane little; it tracks straight and sticks to desired altitude with no unreasonable amount of pilot attention. An autopilot would be extremely desirable for long sojourns in the soggy gray, but hand-flying is not out of the question. Just stay sharp and well ahead of the airplane; with its speed, there is a real possibility that it will arrive at the final approach fix well before you do.

Preparing for departure from Fredericksburg, I ask Sprague to fly a leg and let me catch up on my notes. He obliges, and not 30 minutes into the flight, I stumble upon something that totally changes the complexion of the trip. I take off my shoes. Suddenly, there's an open field of room for my feet; I feel every muscle in my body relax. It makes the rest of the trip go at light speed.

Meanwhile, Sprague maneuvers us toward a line of thunderstorms stretching from Corpus Christi to well north of Houston, causing us to make an end run around them. In a slower airplane, such a diversion would have added substantially to our travel time. Even with this delay, we land in Baton Rouge well before dark. All told, we cover 838 nm in a total flight time of just under four hours.

Friday. Baton Rouge to Auburn, Alabama, to Lakeland—Instrument conditions prevail the morning of our departure from Baton Rouge, and properly energized by a heaping tray of crawfish the night before, we launch into a hazy, overcast sky. I find the Glasair now speaking my language; no longer is it slightly surly, a bit impatient with the human at the helm. We pound through some more IMC, culminating with a localizer approach to Auburn; again, our block-to-block groundspeed sticks very near 200 knots. In Auburn, we meet with others from the Stoddard-Hamilton factory (who have brought along the Glasair II-S demonstrator) and Glenn Lawler, whose III is almost too pretty to look at.

It is decided that we should make the 317-nm trip to Lakeland as a flight of three. I must have been in the rest room when someone volunteered me to fly position number three, the most demanding in formation—even loose formation as we agreed we would do.

Even so, the leg goes flawlessly. Excellent control response and visibility make the III an easy airplane to fly in formation. I spend the better part of two hours staring at the immaculate belly of Lawler's airplane, waving occasionally to his wife, Ingrid, seated in the right seat.

As we land at Lakeland—not my smoothest touchdown, but right where I want it and at the right speed—it dawns on me that the cross-country journey has come to an end. In no way has the trip felt like a long-distance flog. Indeed the airplane's speed, which allows for two-hour (or at most 2.5-hour) legs while still covering some ground, makes traversing big chunks of the country almost effortless. Where in a slower production airplane, you would tend to spend more time flying each leg, a fast airplane like the Glasair allows you to take more time between legs, time to look around a bit. You don't have to hurry lunch to make a schedule. In a sense, speed equals free time.

Of course, you could opt for extra fuel capacity and, with a little help from the winds aloft, make the Long Beach–Lakeland tour in one day and one enroute fuel stop. It's this kind of versatility—combined with the inestimable pride of ownership—that makes having a speedy homebuilt worth the time and expense of building it. Just ask the pilots who have.

—MEC

Form meets function: The Glasairs are are as swift as they look.