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# Laminar Flow Systems can tweak your plane for a big performance boost

**Pilot's Report 5/30/2002**
**J. Douglas Hinton**
*For General Aviation News*

Robin Thomas is a man of many talents, most of which relate to tweaking more speed out of stock aircraft with stock engines. And with this, the president and CEO of Laminar Flow Systems has been very successful because he delivers exactly what he promises.

We reported on the tuned exhaust system, developed by Mr. Thomas' other company, Power Flow Systems, in the Oct. 26, 2001 issue of *GAN* whereby a speed increase of 6.5 miles per hour was realized on a modified Piper PA28-140.

This time, we were back to evaluate further performance increases on the same aircraft, thanks to aerodynamic improvements.

Laminar Flow Systems (LFS), based in Daytona Beach, Florida, is the older of Mr. Thomas' two companies, which formed in the U.S. Virgin Islands in 1983. Operating an air charter company, Mr. Thomas became frustrated over the performance of one of his aircraft, a Piper Seneca. For over a year, he tinkered with aerodynamic clean-up until he was satisfied with the improvements. Rightly recognizing that his efforts could benefit a variety of aircraft, he founded LFS and has been delivering speed kits ever since.

But all was not roses in paradise. St. Thomas was too remote for Mr. Thomas to stay up with his competitors and on top of his imitators. Ergo, the move to Daytona Beach in 1996.

During this year's Sun 'n Fun show, Darren Tilman, general manager at LFS, was kind enough to bring the Piper to Kissimmee, Florida, for an evaluation of the speed kit — or I should say kits — as the whole consists of several speed-enhancing elements, available separately or all together.

As we did the preflight checks, Mr. Tilman showcased the improvements. The most obvious were the speed pants or main landing gear fairings. These are an improved version of the fancy pants and can be installed and removed in one piece. LFS claims a 10.5-mile-per-hour increase over the same type aircraft without fairings. The speed pants are also lighter, stronger, more efficient and $1,000 less expensive than the fairings offered by Piper. Finally, an improved nose gear treatment should net you another two miles per hour.

Hinge fairings and gap seals for the flaps and ailerons offer an additional 5.5-mile-per-hour increase, as does the wing smoothing and fuel tank fairing process whereby rivet lines are covered to reduce drag, and any dimples in the wing surface are filled in with Bondo. These patches are then sanded and checked for uniformity with a meter provided as part of the kit. The wings are then repainted.

It was time to compare these projections with the real world — in the air.

As with previous flights I had made on this aircraft, we were close to gross weight with two people, tanks almost full and over 300 pounds of recording and calibrating gear on the back seats.

Departing Kissimmee to the south to clear Orlando's Class B airspace, Mr. Tilman decided to commence our calibrated climb at 1,500 feet above sea level, ascending to 8,500 feet, noting the numbers every 500 feet.

In 20 seconds, we were off the ground and climbing at 900 feet per minute at 90 miles per hour indicated air speed (slightly higher than best rate of 85). Leveling at 1,500 feet to clear the Class B, indicated air speed was 145 miles per hour.

Cleared to ascend, we started our climb at full throttle and full rich mixture, clocking a rate of climb of 900 feet per minute. Fuel flow was 13.5 gallons per hour. Passing 5,000 feet, we were still climbing at 550 feet per minute and leaning was commenced, reducing fuel flow to 11.1 gallons per hour. Arriving at 8,500 feet, rate of climb was still a respectable 400 feet per minute with a total time-to-climb of 13.97 minutes.

How did this compare to the unmodified baseline Piper? The LFS aircraft, which also had the tuned exhaust system installed, arrived at altitude 6.46 minutes faster (13.97 minutes versus 20.43 for the stock aircraft) and with a 48% increase in rate of climb (465 feet per minute average versus 318 for the stock aircraft).

Leveling for a speed run, our true airspeed pegged at 150 miles per hour, or 28 miles per hour faster than the baseline aircraft.

The airspeed indicator was checked by flying three different headings and correlating the data with the GPS to eliminate error.

Leaning the aircraft further and reducing power to match the true airspeed of the stock aircraft resulted in a fuel flow reduction of 2.8 gallons per hour below that of the baseline aircraft. So a pilot can fly the same speed as the stock aircraft with reduced fuel flow and extended range or cruise at a significantly higher airspeed with the same fuel flow and range as the standard PA28-140.

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At high speed cruise, I noticed the propeller revolutions were about 75 over redline and asked Mr. Tilman about it.

"It's fairly common," he replied. "What we suggest our customers do is have their propeller re-pitched one or two inches. They might lose 30 or 40 feet per minute in climb, but they usually pick up 3-6 mph in cruise as the prop takes a bigger bite out of the air."

## Does your plane qualify?

Currently, the modifications are approved for all PA28s (Cherokees and Arrows) as well as all PA32s (Saratogas, Lances and Cherokee 6s).

Retractables and certain other aircraft can benefit from some of the elements, but not all. LFS does, however, offer wheel well fairings for retractable aircraft.

Mr. Tilman reports that about 50% of owners install the kits themselves, though all the speed kits (including the tuned exhaust system) can be purchased from LFS and installed for $6,870 plus the cost of 34.5 hours of labor (two days turnaround).

As for warranty, all speed kit items are guaranteed for the life of the airplane, except for the tuned exhaust system which carries its own warranty of one year or 500 tachometer hours, whichever comes first. If not satisfied, the customer may receive a full refund within 60 days, regardless of who made the installation.

Adding together all the separate speed increases claimed for each speed kit element (including the tuned exhaust), the modified PA28-140 should cruise at 156 miles per hour at optimum altitude and power settings.

I asked Mr. Thomas about the shortfall experienced on my flight.

"Well, I guess it's the difference between the slide rule and the real world," he says. "We've seen 150 to 153 true airspeed in tests, but never 156. Any turbulence will upset the apple cart, or a lazy cylinder not doing its part. But we're happy with what we've achieved, as are our customers.

"You know, there's a rule of thumb in the modification industry that every one knot gain in airspeed costs $1,000. When you price our kits versus the gain, I think you'll find we come in at twice the gain for half the money."

Can a Mach 1 Learjet be far behind?

## KIT PRICES AND INSTALL TIMES

| | Price | Hours |
|---|---|---|
| Flap and aileron gap seals | $380 | 4 |
| Flap hinge fairings | $240 | 3.5 |
| Leading edge treatment | $680 | 14* |
| Speedpants | $2,000 | 3 |
| Power Flow Exhaust | $3,600 | 10 |

*wing smoothing

Note: Go to the website for more detail on kits by aircraft type.

**Power Flow Systems Inc.**
**877-693-7356**
**LaminarFlowSystems.com**

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**News, 6/20/2002**

## Beat this: A 150 mph Cherokee 140 from Power Flow/Laminar Flow Systems

Most Cherokee 140 owners have a hard time believing the claim that with an STC'd Power Flow tuned exhaust and a set of STC'd Laminar Flow speed mods, a Cherokee 140 will cruise at 150 mph. That represents a 21 mph gain in speed over a stock aircraft. The rate of climb also improves. In stock configuration, the 140 goes from 1,000 feet to 8,500 feet in 18:46, averaging 400 fpm; when modified, it reaches the same altitude in 14:30, with an average rate of climb of 517 fpm, a 30% increase.

"To achieve and maintain the cruise speed of 150 mph at 7,500 feet, it may be necessary to repitch the propeller," said Power Flow General Manager Darren Tilman. "You can still hit 150 mph without repitching, but it takes some hunting. Without the prop change, the 140 we tested easily held 146 mph at 8,500 feet and we did, on a couple flights achieve an MTAS of 150 mph at 7,500 feet."

Mr. Tilman is quick to point out that not all Cherokee 140s were created equal: some will benefit greatly, others not so much. Mr. Tillman says that with all the products in place, the increase in speed can vary from 15-30 mph.

The patented Power Flow tuned exhaust system brings exhaust tubes of the same length into a common collector, eliminating back pressure while increasing engine efficiency.

"It's like adding 15 to 25 horsepower," said Mr. Tilman.

"The key here, is that for a hair over $7,000, you can upgrade a Cherokee 140 to rival or exceed a Cherokee 180 in performance, but with a much better fuel burn. That's a pretty sound investment," said Mr. Tilman.

Laminar Flow, a sister company to Power Flow, has prepared a kit that consists of flap gap seals, aileron gap seals, flap hinge fairings, wing smoothing/fuel tank fairings, and a new set of wheel pants. It takes about a week to install the exhaust and Laminar Flow products. The materials packages are priced at $3,675 for the tuned exhaust system and $3,410 for the Laminar Flow. Individual Laminar Flow products can be purchased separately. Both company's products come with a 60-day money back guarantee.

**Power Flow Systems: 877-693-7356**

**Goodies 7/7/2006**

## New Laminar Flow Speed Pants make a difference

FAA-approved Laminar Flow Speed Pants will add up to 10.5 mph over bare wheels and up to 8 mph over stock wheel pants for all Piper PA-28 and PA-32 aircraft models, say officials at Laminar Flow Systems.

At 10 pounds, these second generation Speed Pants are lighter and up to five times stronger than conventional Piper wheel pants, officials add. They are made of three layers of hand-laid, 10-ounce fiberglass, which is oven cured with a high strength resin. Additional layers of cloth are applied to stress areas. A removable panel allows easy access to brakes.

For pre-1978 Piper models the Speed Pants, strut fairings and applicable hardware is priced at $2,470. Later models can be retrofitted for $1,995 for Speed Pants only, with optional strut fairings available for $475.

**For more information: 386-253-8833.**

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