The Aviation Consumer
The consumer report to pilots and aircraft owners

Lance Speed Mod

Flight Test of the Laminar Flow Systems STC Kit

REPRINT
May 1, 1984 issue

Last year, we reported on a speed mod for Piper Senecas developed by a small company called Laminar Flow Systems Inc. (See the March 1, 1983 issue of *Aviation Consumer* for details.) We found the mod to perform pretty much as advertised, increasing speed on the Seneca II we test-flew by about 15 kts and boosting climb rate by over 200 fpm.

In the meantime, LFS has adapted the kit to fit the single-engine Pipers, and now has STC approval for virtually the entire PA-28 and PA-32 lines. (At this writing, only the PA-28-201 Arrow III and IV are not approved for the kit; that approval is expected shortly.) Price of the kits range from $1,272 to $2,454, depending on the model being modified. (Installation is extra, typically running from $500 to $1,000.) Due to wing variations among the various models, not all parts of the full Seneca kit apply to all of the single-engine models.

The complete kit consists of flap and aileron gap seals, fairing strips to cover wing leading edge rivets, flap hinge fairings and, on the retractable models, wheel well fairings. (Some leading-edge recontouring with body putty has also been approved, and may be done at the owner's option.) LFS's Robin Thomas has claimed that a modified Lance has clocked over 200 mph. and another modified Lance finished second (to Mike Smith's superslick Bonanza) in the Dulles efficiency race, a contest that measures speed, fuel economy and payload.

We were recently able to test-fly a 1978 T-tail Lance freshly modified with the LSF kit. Is the 200-plus mph Lance a reality? Can Piper's boxy load-hauler, when outfitted with the LFS speed kit, actually outpace a stock Bonanza? Based on our flight test of one airplane, the answer is no, but the modified Lance's performance was nevertheless impressive.

Unfortunately, we did not get a chance to do complete before-and-after testing of the same plane, which is the only really accurate testing method. By comparing the "after" speed figures with the handbook performance numbers, however, we felt we could get a decent approximation. (This method is also subject to airspeed indicator errors.)

Our first performance test was rate of climb. The stopwatch started at 3,000 feet, the lower limit of smooth air, and stopped at 12,000 feet. Power was set for cruise climb, and we chose a climb speed of 105 mph, 13 mph above best-rate-of-climb speed, for improved engine cooling. Total time from 3,000 ft. to 12,000 ft. was 14:18, for an average of 630 fpm. At 4,000 feet, rate of climb was 800 fpm; at 8,000 feet, 650 fpm; and at 12,000 feet, 500 fpm. All of these figures more or less matched the handbook climb figures for our weight and temperature conditions—but the book numbers were predicated on full available power (2700 rpm) and best-rate-of-climb speed. In effect, the LFS mod allowed this Lance to achieve full-power best-rate performance while cruise climbing at 2500 rpm. The payoff: more ground covered during the climb, less fuel burned and better engine cooling.

Once at 12,000 feet, we set up 59 percent power (20 inches mp, the max available, and 2400 rpm). According to the book, the T-tail Lance should fly 139 kts under these conditions. We indicated 128, for a true airspeed of 157 kts, a startling 18 kts above the book number. Fuel flow under these conditions, leaned to best economy, was 12 gph.

At 10,000 ft. we set up 65 percent power. Speed worked out to 159 kts, 13 over the book figure of 146. At 6,500 ft. and 75 percent power, the speed was 168 kts, 10 better than the book predicts. Robin Thomas reports a similar pattern in the other Lances he has modified; the speed bonus seems to increase with altitude. He has no explanation for this odd state of affairs.

The owner of the Lance we tested later confirmed the general accuracy of our figures after completing the long trek from the Virgin Islands installation center to his Texas home. He says he's having his engine checked out to make sure it is achieving rated power at the higher settings. Overall, he sounded happy.

We don't blame him. Even taking the most pessimistic figures, he's getting 10 knots better max cruise for about $3,500. The speed bonus is only about half that of the more elaborate Smith Speed Conversion for Bonanzas, but the cost is a quarter of the tab for a Smith job. By our reckoning, that's double the value. The LSF Lance we flew could achieve the book speed for 75 percent power while loafing at 59 percent—and burning 12 gallons per hour instead of 18. This fuel savings amounts to about $12 per hour, and will pay off the cost of the kit in about 300 hours—little more than a year of average flying. Not a bad bargain, as we see it.

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