

**Report on Phase 1 Flight testing of Lancair IV-P N994PT as Approved
Under the Additional Pilot Program for Phase 1 Flight Testing.**

March 3, 2017

This is a follow up report on the use of an approved second pilot during Phase 1 testing for turbine powered E-AB airplanes. I was approved for second pilot operations under a Memorandum issued on October 6, 2016 for my Lancair IVP Propjet, N994PT, s/n L-407.

My Airworthiness Inspection was performed in late October and I brought in my approved second pilot to help conduct that inspection. His (Mr. John Cook's) expertise is specifically in turbine powered Lancairs, with a background of building this model aircraft, being the engine builder and supplier of the turbine engine, and possessing the highest time in type of any owners of this model airplane. I started building this kit in 1999 (yes, over 17 years ago) and completed it with over 8,000 man hours in the build. Although this plane was built to a very high standard, using all certified aircraft construction materials and practices, I was surprised at the items Mr. Cook was able to find before it passed his inspection as ready to fly.

Upon completion of the Airworthiness Inspection and Mr. Cook's personal inspection, we determined there were some squawks that should be addressed before first flight (avionics stuff, throttle geometry not the best and some other minor issues). I did not want to rush making these repairs so I sent him home (northern Georgia) with the intent to have him fly back to the U.P. of Michigan in a few weeks after I completed or upgraded those items of concern. John returned on November 14th, reviewed the completed work, and deemed the aircraft safe to fly. We completed 4 days of flight testing during that trip before John's other scheduled commitments could no longer be put off. We had some more avionics glitches that were worked on over the next 3 weeks (and weather issues that would have prevented VFR flight testing operations). John was able to return the second week of December and we completed flight checks to the point he felt I could safely finish the flight testing myself. We were at 15 hours of flight time at that time.

I flew the plane solo for the first time on December 18th, 2016 (ironically, my birthday).

During the next 25 hours the plane performed flawlessly on the mechanical front, but continued with avionics challenges (most specifically now with the autopilot). John did not have Garmin experience, so despite his tremendous level of experience in Lancair Propjets, there was little he could add to the troubleshooting on this issue. Some of the troubleshooting required performing "soft re-starts" of the main EFIS, which required two hands to perform. This was extremely challenging, to the point I determined this would not get repaired until I was past the mandatory 40 hours / Phase 1 was completed so I could take an avionics specialist (and high performance rated pilot) with me to make those adjustments to the EFIS. Phase 1 was completed on January 8th, 2017.

I will make my bullet points on the pros and cons of the limitation of a second pilot for Phase 1 flight tests / turbine operations and my use of the XP3 flight test program.

Pros

- It is much safer having two sets of eyes and ears in the cockpit during the early stages of flight testing. There were questions that came up during the first flight John needed my input on, as the builder and we were able to resolve them quickly without terminating the early flights.

- John's expertise in the airframe, and specifically the engine, was immeasurably valuable. He knew and could share with me what was working normally, and what needed to be looked at once we landed.
- Due to his vast experience in first flights of Lancair Turbines, he had a regimented check list of items he systematically went through during each subsequent flight. Many times I would fly the aircraft as he would perform checks or record different parameters on the list. This included keeping a running list of items to check/adjust/or correct on the ground after landing as well.
- This is a very complex and high performance aircraft. Having a requirement for the second pilot to be VERY capable during the initial flight testing makes sense.

Cons

- With only two approved second pilots, availability is very challenging and expensive. I got some discount on John's rate for this service, since I had bought my engine from him. With 10 days over 3 trips to my location, and his normal rate of \$1500 a day, this would run \$15,000 for just the first 15 hours on my plane. Conversely, had he been required to fly off my 40 hours, this would have run closer to \$50,000.
- Since flight testing can only be done in VFR weather, scheduling was a serious challenge this past winter in Michigan. Again, having a short list of approved pilots, and those pilots having businesses and other commitments, getting weather and their schedules to work was an issue at times.

In summary, I am immensely appreciative of the effort put forth by LOBO and the FAA in allowing use of the second pilot program by owners of turbine E-AB aircraft. I also understand the concern by some within the FAA about allowing flight test of turbine-powered aircraft with two pilots. It is clear from my experience this was far safer than if a test pilot flew the first few hours and I took the plane up by myself for my first flights and subsequent flight testing later--which was my other option. I have three recommendations to enhance the benefit of the Additional Pilot Program to others (and hopefully a permanent change to the AC). First (and this one may land on LOBO), we need more pilots approved as "Qualified Pilots" for this initiative. Second, with the advent of more and more complex avionics being installed, much of my later test flying time was spent dealing with that. It would be nice to have a "lesser" qualifications level for the second pilot after the first 20-25 hours, where that pilot may have expertise in the system not performing to operational standards (the autopilot would have been my case). Finally, the last 15 hours of flight time during my Phase 1 were conducted with all the needed flight testing under XP3 completed (sans autopilot with which I needed a second pilot to work out). I basically burned jet fuel at 16.5k to 17.5k to complete the "40 flight-hour requirement." The XP-3 program provides a systematic method to complete flight testing using guidance to assure all systems have been checked and verified. This seems much preferable to an arbitrary flight hour requirement that requires that only a couple of V-speeds be checked.

In great appreciation,

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 N994PT