

## Learjet

My friend and I own a Cessna 150 and as far as I am concerned, it will always be the best plane there ever was. After all, we can afford it and do most maintenance. Still, it was a considerable thrill to go and fly a Lear jet, not to mention deeply humbling.

Owning a Lear jet is actually within the reach of a lot of private people. Operating it is another story. If you check out trade-a-plane, you will see that Lear 23's and 24's are going for less than the cost of a recent Seneca. The problem is flying safely, then the cost of fuel and parts.

A Lear 20 series burns about 700 dollars an hour in fuel, but you have to remember that Florida is just a couple of hours away from Toronto. You could start comparing the cost of the Jet A in the Lear to the cost of Avgas in an Aztec taking 7 hours to do the same thing (with multiple stops) and the Lear starts to sound almost reasonable. A really good jet salesman would just ignore the direct question of operating costs and mention that block speed for flight planning is 450 knots "and going eastbound, you will probably see 600 knots ground speed in the jet stream." If this does not cause you to lose contact with financial reality, the salesman could say "imagine taking off in front of your friends and doing 10,000 fpm at 25 degrees nose up! And noise! This thing sounds like a military fighter!" And, indeed, it does sound like a fighter, since the CJ610 turbojets are civilian versions of the engines found in the F-5 and T-38 military jets. Conveniently omitted from this sales pitch is that fact that many airports ban noisy aircraft like the Lear 20 series.

Another thing hidden in the fuel cost of an early turbojet is that the fuel flow on the ground is not much less than in cruise. On the Lear 25, for example, each engine is burning 700 pounds per hour of fuel in cruise over 40,000 feet while doing Mach 0.80 (450 knots). Sitting on the ground in the takeoff line up, each engine is burning about 500 pph. Most people taxi on one engine. With the climb and taxi fuel, it works out to about 2200 lbs of fuel in the first hour of flight, with less after that, when you reach high, efficient, altitudes.

As far as maintenance, there is some good news: the engines give no trouble at all compared to piston engines. Even though they are noisy and very inefficient, they are also powerful and bullet proof in reliability. Nothing seems to break on the General Electric CJ610 turbojet. Stuff does wear out and need to be replaced on calendar and hour times, though, and this is the catch. On the C150, a mechanic saying that a part will be "about 5" means \$500. On the Lear, costing "about 5" means \$5000. And any Lear part bigger than you fist with generally costs "about 10."

How does one get to fly a Lear jet? Renting is out of the question for most of us. So, one must find a kind owner of an American registered Lear to give you a ride or a kind owner of a Canadian registered Lear to give you a type rating. I did both. How does one find kind owners of Lear jets? Well, join COPA. There are some COPA members who own jets and fly them recreationally.

First, the American-registered option. The friendly COPA member who was kind enough to respond to my persistent demands for a ride told me that, since his Lear was US registered, the co-pilot does not need a type rating, just a US license with instrument rating. Any American FSDO will give you a FAA license once you show them your Canadian license and pay about \$30. For the instrument rating, I had to write (or type, it was a computer terminal) an exam at a Rochester FBO. The FAA did not even charge me to add the instrument rating to my US license-“Well, you paid for the license already, did you not?”

Legal to be a co-pilot, I flew the C150 down to the kind gentleman’s farm, where he bases his Lear 24. He pulled the Lear out of the barn with an old tractor. It must be nice to have a private airstrip on your farm. Inside the jet, it looked complicated, but vaguely familiar from reading the 1973 pilot’s manual. Today’s mission was a 10-minute flight north to a paved runway.

To start the engines, one turns on the batteries and throws the start-generator switch to “start.” A sound like a vacuum cleaner starting begins and the RPM gauge winds up to about 12%. Once it is past 10%, you push the throttle to idle and, if all goes well, the engine “lights up.” Just like a Coleman stove, the fire starts burning in the combustion cans and the Exhaust Gas Temperature (EGT) starts winding up, along with the RPM. You have to watch the EGT does not go beyond the red line on the start, otherwise you melt turbine blades. If the EGT starts to get too high, you pull the throttle to idle cut off, which stops the fuel flow and lets things cool down.

Of course, I did not see much since I was reading the multi-page pre-start checklist as the plane’s owner was casually throwing switches to start up the engines. You have to wait a minute or two between engine starts since it takes a lot of current to start (about 400 amps) and the battery needs to recover after start #1. A couple more pages of checks for things like trims, flaps (10 degrees) and warning systems and we were ready for takeoff. There was no control tower on the farm, and the only traffic around the runway was bovine.

Of the 10-minute flight, I remember that things happened too fast for me to read the checklist items. To be really professional on take off, you should set a certain Exhaust pressure ratio (EPR) based on temperature. But some pilots just set the RPM at 100 % and ignore EPR. By the time you can say “rotate, positive rate, gear up” and change radio frequencies, you are already through 1500 feet. So, if you took off with 100% RPM and want to level at 2500 feet, the trick seems to be to pull the throttles way back-say to 85%-after gear retraction. Then pull them back to 75% when you level off. Otherwise, at 2500 feet you will exceed the 250 knot speed limit below 10000 feet. Also, a horn goes off if you exceed 306 KIAS below 14 000 feet, which is very easy to do.

Since I was looking at the pages of checklists and the owner evidently had not been up flying in a while, we became Temporarily Unsure of Our Exact Position while doing 250 KIAS at 2500 ft to stay out of the local terminal area. Once I realized the slight confusion about position was shared by the pilot in command, I tuned in the beacon for the active runway at our destination. Our navigation problems were solved about the same time ATC figured out that we were a formation of 1, not 2, when I turned off the second transponder, which was set to a different code from the first.

Things calmed down as we got a vector for base leg. Again, not enough time to read all the items on the checklist before they had to be done. However, even in my rushed and ignorant state, I did notice one thing that even a C150 pilot could guess: there should be three green lights by the gear handle, not just 2. So, we pushed the throttles forward and asked tower to please take a look at the landing gear. The tower seemed familiar with this particular registration and gave some friendly advice to "be careful." I knew from the pilot operating handbook that there was a compressed air bottle for emergency gear extension, but that was all theory. In practice, I had not yet located the little tab next to the throttle pedestal. Besides, the captain owned the plane, the friendly tower said that there were 3 gear out and when we landed, the mud from the farm shook loose and 3 green lights came on.

In Canada, both pilots in a Lear jet must be type rated, which seemed like a good idea after trying a flight without a type rating. It costs nearly \$20 000 when you include hotels and travel expenses, so finding some kind person to pay it for you makes perfect sense. I was throwing freight into the Native reservations around Pickle Lake when somebody in Toronto turned down a Lear jet job offer that they had previously accepted. The jet charter company had already booked the Lear training course and stood to lose their deposit unless they could find someone to go, so with 4 days to go before course start, it was a good time for my resume to come in over the fax machine. The offer was fairly simple: "your qualifications are minimum, but if you pay for the course up front and work for us for 2 years, we will pay you back the training money in addition to your salary." Fair enough. It worked out to a free Lear type rating course and a modest salary for a couple of years. Did I mention that the Native airline had laid off 60 people, me included, the week before and that I had \$20,000 in my bank account from working up north?

Avoiding Pearson airport by landing at Buttonville in the C150 and taking a cab across town, I saved a \$75 landing fee when I dropped off the 20 grand before heading to Dallas, Texas, for the Lear jet type rating course. At Dallas-Fort Worth (DFW), the airport is active 24 hours a day, and the training pace at Simuflite seems to be at about the same intensity. As a newcomer to jets, the experience was humbling. The first time in the simulator, I could not hold altitude better than plus or minus 1000 feet. The old Texan shouting behind me probably did not help much either. Then the instructors throat got sore after half an hour and, in the sudden silence, the altitude and heading stabilized. The instructor watched silently for several seconds, then shouted "Now you got it!" and whacked me on the shoulder so hard that I lost control of the simulator completely.

The Lear 20 series has a funny characteristic compared to other planes I have flown: if you are holding back pressure on the control column, say in a climb, and you relax back pressure to start to level off, the first thing that happens is that the rate of climb increases. Then, after a couple of hundred feet, forward pressure eventually causes a level off, but it is not instantaneous like a prop aircraft. If you are unfamiliar with this, by the time you have stopped the climb, you have overshoot the target altitude and want to go down. Now, when you relax forward pressure-pull back to arrest the descent- guess what? The rate of descent increases before it decreases. How fast does all this happen? Well, the VSI pegs out at over 6000 fpm on every takeoff and an instructor told me that at light weights, on a cold day, you can get 13000 fpm up. The way to control all this power and speed is to anticipate level off by 1000 feet and to use pitch corrections of maybe 1 or 2 degrees at a time.

To slow down, or go down, in the Lear, one should not be afraid to pull the power right off. After all, you can not shock cool a turbojet engine and there is not much drag on the aeroplane to slow you down otherwise. Even with the power back to 90%, in level flight, one can easily exceed the red line of Mach 0.82. (Up near the ceiling of 45 000 feet, the air is so thin that the indicated airspeed is reading in the 200's while the true airspeed is 450, so one uses Mach number instead of indicated airspeed.) To both descend and slow down quickly, you need the spoilers. With the flight characteristics of a streamlined anvil, any nose down attitude will pick up speed in the blink of an eye. But here is a little trap: if you do over speed, do not deploy spoilers to slow down. They pitch the nose down and cause you to over speed even more. Spoilers are only for slowing down under the red line, not over it.

You do not have to memorize approach speeds on the Lear, or any other jet. The reason is that fuel is a significant percentage of aircraft weight – 6000 pounds out of 15 000 total. The aircraft weight changes so much from full to empty tanks that one approach speed will not work for all cases, unlike the C150, where fuel weight is less than a tenth of gross weight. So, before each flight in the jet, one figures out the landing weight and an approach speed,  $V_{ref}$ . On the model 25,  $V_{ref}$  starts at 129 KIAS at the maximum landing weight of 13,300 lbs and decreases by 1 knot for every 200 lbs below that. The same goes for the minimum climb speed on takeoff-it changes with weight and temperature, with 135 KIAS being for maximum weight on a warm day.

Is the Lear 25 a nice airplane to fly? Well, what is nice? Exciting, exhilarating, fast, reliable, all yes! But nice people do not try to kill you if you turn your back for a couple of seconds, and neither should nice airplanes. Moreover, nice people forgive mistakes. The Lear 25 does not. The Lear 25 is not nice: it demands respect and discipline. It is like skiing--if you have some skill, follow the rules and stick to the known runs, things will be fine. But if you try to do things your own way and "hot dog" it through the woods, you will probably end up injured. Buy a Cessna. They make nice jets as well.