L-39 Pilot Report

by Barry Hancock

PART TWO

Let me quickly recap the first half the article I've written to get you up to where we left off…210 knots in the climb. By far the most popular jet warbird in the world, the L-39 is perfectly suited for it's mission of introductory jet training for at least 14 nations military forces around the country. The same characteristics that make the jet the most popular military trainer of its era – relatively low operating costs, good flight characteristics, ease of maintenance, and high reliability – also account for it's civilian success.

I have recently developed a relationship with the son of the general designer of the L-39. As you can imagine, I have learned more about the jet in my short relationship with him than I have in my previous several years of being involved with the Albatross. Aside from the wealth of technical information, there are a couple of really interesting things about the jet. For example, take a long hard look at it and tell me what two US aircraft of 1960's vintage you see…essentially, the L-39 blended the A-4 and F-5 airframes to come up with what is still one of the better looking jets ever designed. In any event, let's get back in the cockpit….

CLIMB OUT

With the wheels in the well, throttle back to 103%, and an established climb speed of 190-210 KIAS yielding a 2000+ fpm climb, it's time to check the gauges again. One of the nice features of the L-39 is the modern caution / warning panel which instantly alerts the pilot to any impending or immediate problems far faster than can be accomplished by even the most consistent and comprehensive of scanning methods. Aside from the normal engine checks, the next most important check a pilot needs to make on climb out is the function of the pressurization system. At approx. 6500' MSL, the cabin differential pressure gauge should start showing building pressure in the cabin. The pressurization also relies on partial pressure from the ECS (Environmental Control System). Without getting technical, the pressurization system will keep you comfortable even into the low flight levels, but obviously O2 supplied by the onboard system, is a good idea at anything above 18,000'.

On a standard day the 2000 fpm climb rate will start deteriorating at about 8000' MSL, and by the time you hit 16,000', your rate of climb is down around 1000 fpm. The Progress AI-25TL is a high bypass turbofan engine, and what it gains in efficiency, it looses in the ability to maintain thrust at altitude. Still, a pilot new to jet flying will be caught off guard by the relatively impressive climb performance and busting an assigned altitude is easily accomplished if you're not vigilant!

I'M UP HERE IN A HURRY, NOW WHAT?

Cross country flying in the Albatross is quite nice. If you elect to go VFR, 16,500-17.500' MSL will yield the best fuel economy and lowest traffic environment. Cruise speeds at nominal setting (98%) will typically be about 295-300 KTAS and yield about a 150 gph fuel burn. The optimal cruise altitude for the L-39, however, is in the FL 200-240 area where fuel burn is back to about 135 gph but KTAS is up to about 315. Without at least an altitude hold, however, it is a bit of work as it doesn't take much in this neutral stability platform to get off altitude. Conservative range is about 500 nm with a standard fuel system. With drop tanks, as on the L-39ZO/ZA, that range is extended to about 800 nm, but the drag penalty translates into burning about 50% of the extra fuel just to carry it. Nonetheless, having that option both looks cool and affords you need flexibility when going cross country, particularly in places like the upper Midwest or Northwest.

As you might imagine, however, even sitting on a custom parachute gets a bit sporting after an hour and a half, and certainly sitting in an ejection seat equipped plane will have you massaging your kiester upon reaching terra firma. Oh, the sacrifice of it all! ;)

STRAIGHT AND LEVEL NOT RECOMMENDED!

These jets were made to be flown hard. In military training they are regularly pushed near their limits of +8/-4 G's, and this beautifully designed airframe is as straightforward to fly as your local flight school's Decathlon. Those of you familiar with CJ and Yak aerobatics will feel right at home in the Albatross, with three *major* exceptions. First, by their nature, jets are much more sensitive in pitch and you can snatch on the G's in a big hurry without much effort. Second, because you are flying a 4+ ton aircraft the inertia and speed combine to keep the G on much longer for the same stick pressure. The first time you do acro on a jet, it's the biggest difference you'll notice. Because of this, G-awareness must be monitored closely at all times. The third difference is that you need a lot more room to operate. For example, your 800'/3.5 G loop in a CJ or Yak becomes 3000'- 4000' in an L-39. Any vertical maneuver needs to be planned with care to keep from both busting Class A airspace if you're playing in the teens, or uncomfortable encounters with Mother Earth if you're below 10,000'.

The L-39 rolls at an honest 270 degrees per second. Ten degrees nose up is all you need to accomplish an aileron roll and complete the maneuver in a level attitude. Entry speed for the loop/Immelman is 320 knots, which consumes at least couple thousand feet of dive at full throttle to get to 320 KIAS from your normal cruise of about 270 KIAS – though it's fun to watch the altimeter unwind like a stopwatch in reverse! When compared to the piston trainers, a loop seems to take forever to complete – especially when going up the front side and in the vertical for what seems like an eternity at first. However, after a few aerobatic hops in the plane to get acclimated to the differences, you can really have some fun! From pulling into a 45 degree nose high attitude and completing 4 rolls before reaching level flight (and then recaging your internal gyro!), to

zoom climbing several thousand feet…all in air conditioned comfort mind you…the envelope is very large and forgiving, which brings me to the next phase of flight.

OUT OF CONTROL FLIGHT

The term "Out Of Control," or OCF, is really a misnomer with the L-39. Remember this is a trainer and is inherently straight forward to control during stalls, spins, and accelerated departures. The aircraft talks to you through the flight controls very well. At the onset of buffet, you can feel it at the base of the stick. If you want to push her a little further, she'll start talking a bit louder as the vibrations increase and the shaking seems to work its way up towards your hand. At this point, any accomplished pilot understands that departed flight is close at hand and only intentionally ignoring these signs should worsen the situation. Full stall is maintained in a slightly nose high attitude with ample rudder to keep the wings level. As you might imagine, descent rates can get quite high (4000+ fpm) but the plane remains easily controllable throughout the stall regime.

Spins are also straight forward. Spin entry is accomplished at about 110 KIAS. The L-39 prefers to spin to the left, and the revolutions are more stable, but the aircraft enters a right spin easier. After the first rotation in either direction angular velocities increase slightly and the motions are non-uniform, but still fully predictable. Normal recovery techniques work well and a fully developed spin recovers in no more than one additional revolution with proper inputs. Having 10,000 lbs of shuddering metal around you does take a bit of getting used to, but one OCF evolution in this aircraft will have you both amazed at its grace and and confident in it's design.

BACK IN THE PATTERN

The standard overhead pattern entry speed is 250 KIAS at 1500' AGL. Of course, airspace regulations and pattern environment dictate speeds and procedures, but for our purposes, we'll assume an empty pattern at an uncontrolled field.

A standard break of 60 degrees of bank and 2 G's while putting the throttle to idle and deploying the speed brakes will put you at about gear speed of 180 KIAS. Roll out, gear down, boards in, power back up to at least 70 % to avoid excessive spool up time (the real "gotcha" in this airplane), and select flaps 25 at 160 KIAS. Power up to about 85% to maintain at least 1000' AGL on downwind. At 140 KIAS select flaps 44, check hydraulic gauges and as the numbers hit your landing light on the front of the tip tank, start your turn back to the runway, ensuring that you maintain *at least* 135 knots, until you roll out on final. In this case, you should be about 200-300 AGL and 1/4 mile from the numbers. Throttle back to 120 knots and once landing on the runway is assured, close the throttle and maintain about a 7 degree nose high attitude. Hold it off until it hurts and, with the trailing link main gear, you can just about assure a greaser every time. It is the easiest plane to put on softly that I've ever flown.

All that being said, if the L-39 is going to bite you, it will most likely be in the pattern. A spool up time of approx. 9 seconds from idle to full thrust and a typical landing weight of

just under 10,000 lbs can combine to create problems, but keeping RPM above 70% and not getting slow are sure ways to avoid getting caught in an undesirable situation.

CONCLUSION.

The Albatross is a true heavy iron warbird that is a blast to fly and simple to maintain. Modern conveniences of pressurization, redundant systems, and automated safety features not only make it a more enjoyable experience to fly, but safer as well. With an operating cost comparable to, or better than, any other high performance warbird, and purchase costs that are a fraction of anything that can compete in cool factor, the L-39 is simply the best high end warbird available. It is also likely the last of it's kind. The L-39 is one of the last of the electro-mechanical jets produced. More modern jets becoming available on the civilian market perhaps are better performers, but when you combine the cost of operation, availability of spares, quality of training, and the higher currency standards required of higher performance aircraft, it is safe to say that the L-39 will go down not only as the most popular military trainer of it's day, but probably the most popular jet warbird ever.

About the author: Barry Hancock is a commercial pilot who holds a multi-engine instrument rating. He began flying CJ's with only 70 hours total time and has amassed over 900 hours in various warbirds including the CJ-6, Yak-50/52, T-6, T-28C, and L-39. He is the owner of Worldwide Warbirds, Inc. in Chino, CA, which specializes in the restoration, sales, and service of jet and piston warbirds.