AVSIM Commercial Aircraft Review

L39 – Albatros

Product Information		
Publishers: Lotus Simulations		
Description: add-on aircraft.		
Download Size: 209 MB	**Format:** Download	**Simulation Type:** FSX
Reviewed by: Proflig8tor AVSIM Contributing Reviewer - August 23, 2009		

Introduction

Some say he never sleeps, and he has no sense of time. All we know is **Mike "Lotus" Johnson** is a name familiar to

many of us who spend any time on the Flight Simulator forums and to anyone who has enjoyed his FSX films such as “Back to Mine”, "Vectors", "Lament", "Vantage", and "Elyonim." After seeing these films, many of us went in search of “that cool aerobatic jet” frequently featured performing beautifully choreographed formation flying set to music well suited to the images on the screen.

The search revealed that the L39 Albatros featured in these videos resided only on the computers of Mike Johnson and a few close friends. It was tantalizingly beautiful and yet, completely out of reach. To maintain a watch for when it might be released, or hopefully developed into a commercial product, I started watching Mike’s Lotus Film’s blog, which is a treasure trove of inside information for FSX product development, current events, and well written opinions.

One of those opinions is that multiplayer flying is the future of Flight Simulation. Human beings are social animals and multiplayer experiences are growing, rapidly. But, many add on products for Flight Simulator challenge the capabilities of personal computers. Mike’s goal was to design a product that would be his personal favorite and he is a guy obsessed with smooth motion and frame rates. He spent a lot of time looking at draw calls, polygon and texture vertex counts and built the L39 with an eye on efficiency. Effects like shadowing and especially those requiring two pass rendering like water reflections or bloom can be real frame rate killers, but managing the polygon count just simply makes a huge difference. How much of a difference? Well, on his blog Mike writes:

*“Performance of the already very lean external model is now up by about 25%, which puts it somewhere between 1/3 and 1/2 of the performance hit of the quite efficient Acceleration F-18 in multiplayer. I've also done some tests with the special formation team model, a 'no frills' L-39 which lacks bump and specular mapping, but which absolutely blows the doors off anything out there performance wise. The final count on that model came in at around 20,000 texture vertices, and that means it's even less of a rendering hit than the default Extra-300... aka it's *FAST*. On a really good system you should be able to get at least 10 of those Albatross on screen before noticing any kind of real performance hit. If you're into large online formation team flying then I hope that extra effort will be a big help to you.”*

If you don’t fly multiplayer, or use FS Recorder to play with formation aerobatics, do you care about this developer’s passion for efficient design? Yeah, you should. Aircraft that fly smoothly are simply “better.”

The L39 is a smart choice to showcase the very cool multiplayer features in FSX. One of the best features most often overlooked is shared cockpit mode. The L39 was designed to “simulate” failures from the rear cockpit facilitating the training of emergency procedures and boldface checklist items. The front seat pilot has a hood to block his external view to simulate instrument flight conditions as the rear seat instructor can induce failures to train the pilot. Even simulating failures of the pitot and / or static side of the pressure instrumentation. I’ve already told a friend who’s son is about to start pilot training to buy the Lotus Simulations L39 solely its superb ability to easily simulate partial panel instrument flying.

Rather than reproduce a Wikipedia like recap of the world’s most popular jet trainer, we’ll cover the basics of the L39C in this review.

Installation and Documentation

Purchase Cost & Availability – Currently $45 from www.fspilotshop.com or 32.00 EUR from simMarket as an instant download.

Installation – The installation downloads a 202MB .exe file, which installs at 469MB. Users of MS VISTA with user account controls will want to ensure they right click on the installation file and “Run as Administrator.” Then typing in

your registration key provided with purchase completes your install and has you running in minutes. You'll find 14 aircraft to choose from, with choices for single player, shared cockpit, shared cockpit with an IFR training practice hood and a special multiplayer formation team model (with a front cockpit only, no bump maps, reduced feature set, and very high performance external model).

(Note: the blue boxed aircraft is one of the repaints I had already installed and does not ship with Lotus Simulation's L39 download. In addition to the aircraft listed, Lotus Simulations has released a Breitling Team L-39 available from their website for free download.) The included aircraft have a nice variety from the race modified PipSqueak to the Fighter Trainer variants with non functional external armament and those with long range fuel tanks on their external hard points.

Documentation – Lotus Simulations includes a 120 page PDF Flight Manual credited to Pebble Garden. It provides a reasonably brief overview of L39 operating instructions with frequent descriptions of the aircraft's characteristics and great imagery, keeping the reading light and enjoyable.

While you can probably make it around the pattern without reading the manual, you'll probably not understand what you see on the panel unless you are familiar with Eastern Bloc aircraft and their approach to what they refer to as avionics. You'll lose the engine when you exceed limitations, so planning 30 minutes to an hour with the documentation will save you time later.

The Flight Manual also includes very easy step by step guide to multiplayer flight and instructions on the shared cockpit modes of operating this airplane.

If Lotus Simulations revises this manual in the future, I'd suggest adding graphic profiles for flight patterns, formation flying and aerobatics. A user could enjoy exploring it by following the footsteps of Military Pilots who learned the art of flying in L39's, with manuals like this.

Tutorial – Mike Johnson has posted a series of tutorials which supplement the Flight Manual, which can be viewed on YouTube.

Aircraft Model & Paint

So you are thinking, if this L-39 is so fast, it must have cut some corners, right? Something had to be given up in the complex shapes like the inlet splitter and sculpting around the jet pipe. No, the shape is beautiful, and smooth. One web board poster used a pic of Fabio selling low fat butter to explain just how smooth it is.

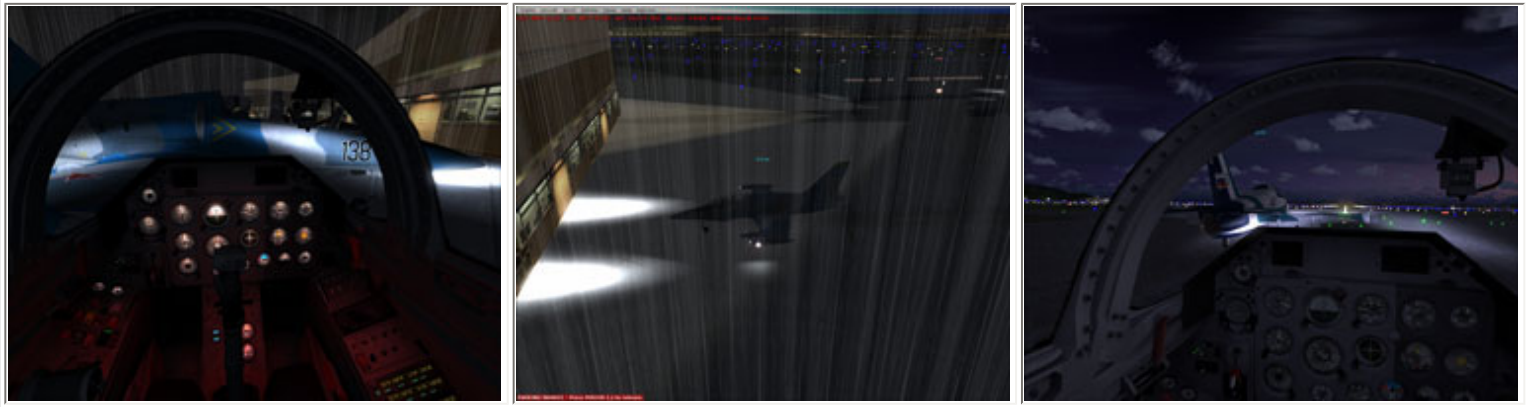
At one point in the model's design it was substantially revised based on measurements and notes taken when L39 owners (who are fans of Mike Johnson's work) invited him to spend time crawling all over the airplane, taking measurements and notes. Some of the design cues in the airplane could have only come from a more "intimate" view that mere pictures and plan form drawings can provide. Nice touches abound, but I'm particularly impressed with the views of the wing and fuselage which show the skin's attachment to the underlying surface. I also really like the small details, like the way the mechanical down-lock indicators for the landing gear rise slightly as the down locks go over center and lock in position.

		
Fuselage Bump Mapping	Wing Detail	Lower Wing Skin Surface Detail
		
Aft Fuselage Detail		Details like the VG's on the Stabilizer and Static Wicks
The limitations of .jpg compression does not show details adequately, but you can get the idea		

Perhaps that is just a sign of things modeled particularly well. There are no problems with lighting effects becoming separated from the airplane, or clipping, because there are not .fx files. Lights are designed into the airplane model itself. The only effects files are the flares from the flare dispenser and cockpit flood lighting. A huge advantage to this approach is that users running DX9, or DX10, or different operating platforms should all get to see a consistent product, avoiding the common complaint that some designers have with a model that only works optimally on the system it was designed on.

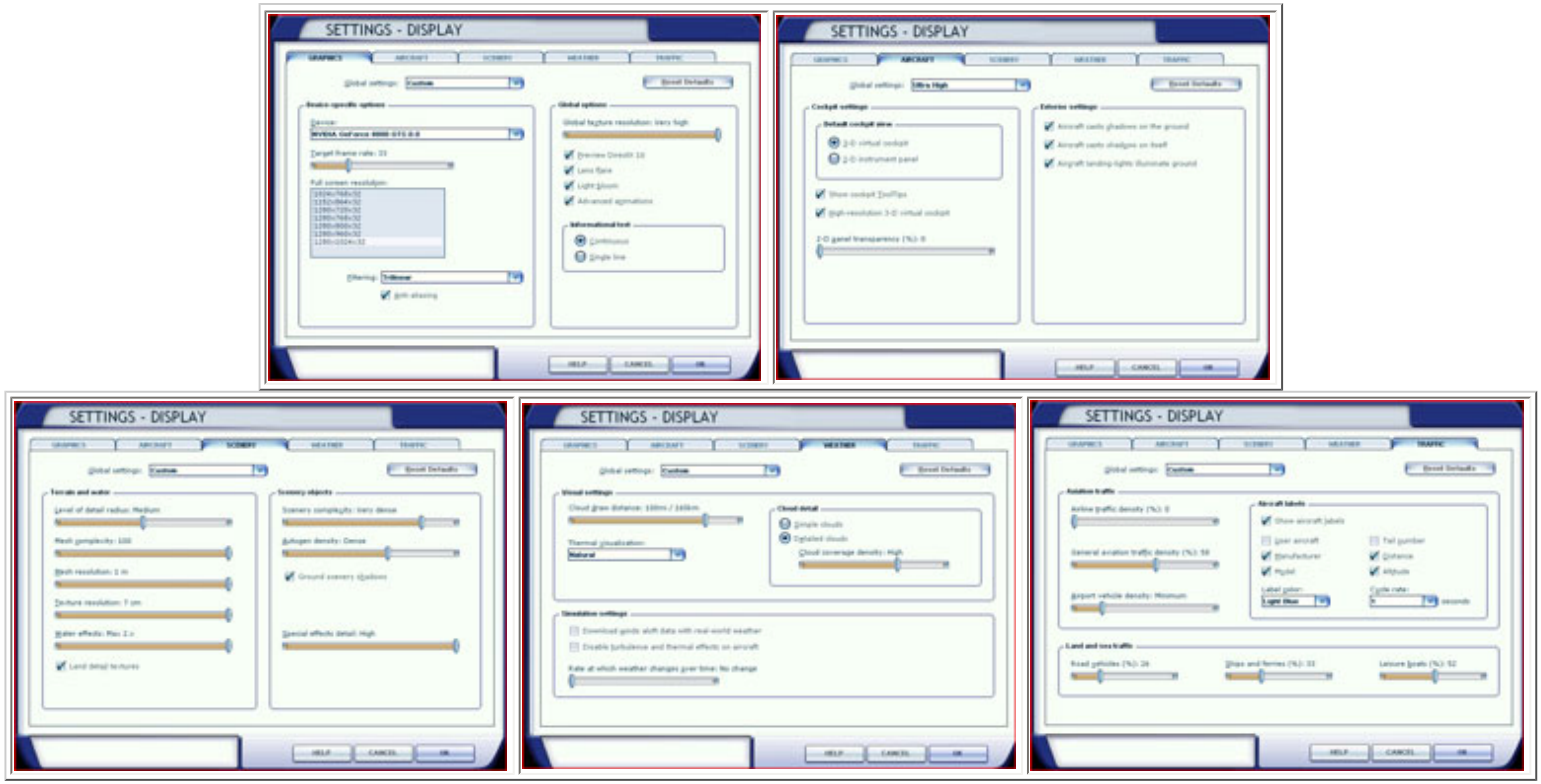
And speaking of lights, I'm not sure I've seen any in Flight Simulator ever work like this. Strobe lights illuminate the ground when they flash. Landing lights illuminate other objects, even raindrops and other jets in a tight night formation! Of course this realistic lighting leads to buffoonery like canyon running at night, buzzing ships in the harbor to see the lights reflect off the sails and the worse the weather, the better it looks. The next logical question is, "wonder if I can do that in a four ship formation?"

Joking aside, the lighting on the 3D instrumentation, the flashing strobes and the realistic modeling of the lighting into the model really looks terrific, much better than my compressed web friendly .jpg images can show. Movies better illustrate the effect of needles getting brighter as they get close to the instrument's light source, the flash of strobes on the ground and the perfect shading of the position (formation) lights on the side of the L39's equipped with them. Each cockpit has individually adjustable lighting, allowing each player to set lighting to their tastes when flying in shared cockpit.



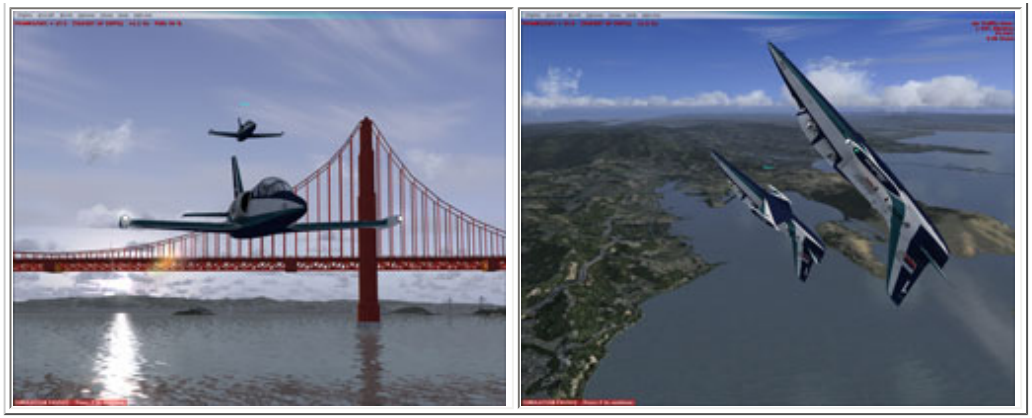
Night Lighting: In center photo compare the L39's lights to another FSX Native model. Notice the strobes and the fact that the L39 can illuminate ground equipment and other aircraft. Unfortunately the screen capture and conversion again lost detail and the "flash" from the strobe's operation is something better seen in a movie than a still shot.

Since the speed of this model is one of its highlights, I've posted screen captures of the sliders on my system for the test and images with the Frames Per Second in the upper left hand corner. Generally I consider 30 frames per second as the lower end of what I like to see during flight. But to get readers nice images I often am forced to accept rates in the teens and for our MD80 review I remember landing with refresh rates as low as, gulp, 7. With this L39 it is not necessary to compromise image quality to achieve high frame rates, even with more than one aircraft on the screen. As you will see, with my somewhat outdated system I still enjoyed frame rates near, or well above, 30 FPS with Lotus Simulation's L39.



The aircraft model stops with the aircraft. There are no buses, fuel trucks, pitot covers, engine covers, chocks, or other effluvia that attach themselves to the airplane at shut down. I don't miss them. This model is all about flying, working well and looking good while doing it at higher frame rates than you've probably seen on your system in a while. I do apologize for not getting pictures of the open canopies and footholds for those who really like eye candy.

The model is already inspiring many repaints. Banana Bob already has several very good ones that are well worth a little donation to keep his work alive.



Flight Model

The flight model of Lotus Simulation's L39 is exceptional, reminding me on first impression of past favorites like Real Air's SF260. But this one might be even better.

Steering is provided by differential braking. Even for those without pedals, a twist of the rudder, or the Num and * or – for right and left, will get you lined up. But, you really want a descent set of controls to enjoy this model to its fullest. On external view you will notice the elevator is deflected upwards. This is due to the aircraft's flight control system, which provides mechanical assist to the pilot in pitch, via springs and counterweights. The goal is to keep the airplane easy to fly over its wide speed range and with G loading. The Lotus Sim L39C's controls are nicely balanced and easily coordinated. The aircraft requires very little trim, which is good because the trim is not particularly effective.

The real L39 is not an overpowered aircraft and external tanks and a pair of pilots can load the aircraft up to the point where consideration is needed to depart a relatively short runway at high altitude fields on hot days. Balanced field length is around 6,000 feet to either get airborne, or get stopped if the takeoff is aborted. The preferred technique is to hold the brakes while the engine spools up for around, taking about 10 seconds. The airplane rotates at about 105 knots, or 170 Kilometers per hour as indicated in the L39. As you clean up, look for 280 KPH to continue your climb at about 15 degrees nose up. This will net 20 Meters Per Second which works out to be in the ball park of 4,000 Feet Per Minute.

Test System

Intel E6600 Clocked to 3.0Ghz
4Gb linked & sync'd at 667Mhz, 1333 FSB
EVGA NForce 680i
Single GeForce 8800 GTS
SATA RAID 0
Microsoft Vista SP1
Flight Simulator FSX + Accel

Flying Time:
30 hours

The climb rate starts to decline through 8,000 feet as is typical with jets powered with bypass turbofans. Most owners cruise their jets in the mid to high teens where the cruise speed will be about 300 knots on 150 gallons per hour. Clean, the aircraft has fuel for about 500 NM, and can go about 800 NM with the drop tanks, although the drag of the tanks eats up some of the fuel being carried out there. At least they are modeled and they work in Lotus Simulation's L39.

True to its role as a trainer, the L39 lacks even a basic autopilot and barely has sufficient avionics for cross country flights without radar vectors from takeoff to landing. Mike Johnson has thoughtfully installed a Garmin GPS, as most Western operators have, so you can go somewhere if you are inclined to fly the thing cross country. Back in the day that

I used to fly military trainers on cross country flights it took very little for me to get bored and fly part of the journey inverted (as long as you maintain altitude and heading, Air Traffic Control does not know and does not care that you did part of the trip – inverted) But we are in FSX, so lets abandon the rules and enjoy the L39C for what it is, a fun little hot rod.

Aerobatics in the L39C, like any clean low powered aircraft, is all about managing your energy. You have to think at least one or two maneuvers ahead when putting on impromptu air shows. The L30 has a great high lift wing, which is forgiving and predictable. Departure from controlled flight is preceded by plenty of pre-stall buffeting along with the stall warning horn's activation as the aircraft approaches the cusp of its critical angle of attack.

The L39 is one of the very few Flight Sim aircraft that properly snap roll, or spin, and recovery accurately and predictably. When recovering from a stall it is necessary to reduce angle of attack sufficiently to "re-attach" the airflow to the wing and without doing so a secondary stall is likely.

Again, this FSX model is also relatively unique in its capability to manage uncoordinated flight well, like slips on landing, taken to the point of doing knife edge passes with total control. You can even recover from a shallow dive on knife edge with sufficient rudder pedal deflection.

Knife Edge Passes

How about making synchronized spins an Olympic sport?

Is anyone watching the flight lead?

PipSqueak's light weight makes her a natural dancer	Another knife edge under the bridge	Looping the bridge
This thing is an absolute hoot to fly – YIPPEE!		

Engine operation is realistic, modeling the slow spool up time. Although, it might be a touch too slow from 95% to 103% N2. I've found in real world flying that once you get airflow through the engine at higher speeds, the responsiveness improves. This is particularly true of older turbines which lack Electronic Engine Controls to moderate their peaky natures. The most significant real world lag is just off idle and modern jets cope with this by electronically raising idle speeds on approach to keep the engine closer to its sweet spot and adding fuel to improve acceleration. Since I've never flown the real L39 and there could be a governor in the fuel control itself, I'll defer to Mike Johnson's judgment and note that many real world pilot reports mention the same lag I'm seeing in this model.

This lag makes it a slightly difficult to hold station in formation flying, which is more difficult in simulators than it is in real life anyway. One technique is to maintain around a 5% N2 split between the Lead and Wingman, then have the wingman use his speed brake to scrub off a knot of two when he starts to overtake the lead aircraft.

The engine's spool up time is where the L39 can bite you in the pattern. Fly an overhead break and plan short final around 130 knots, or 280 Kilometers Per Hour indicated. As with the formation flying, using your speed brake and maintaining engine RPM helps to mitigate the slow spool time of the Ivchenko-Progress AI-25 engine.

Virtual Cockpit and Systems

The L39C trainer was built with the ability to replicate the more complex airplanes students would transition to, as well as to simulate failures. Like a flying simulator, the instructor in the back seat can fail electrical, pressure gauges, and instrumentation. In addition, the L39C is designed with a great deal of systems redundancy. The Virtual Cockpit in Lotus Simulation's L39C puts you in command of either seat with full functionality of the aircraft systems, as well as the ability to "fail" systems from the rear cockpit.

As with the rest of the Lotus Simulation L39, the Virtual Cockpits have been designed with speed and low overhead in mind. The gauges and instrumentation are 3D, which not only reduces the drag of 2D draw calls, but which also has depth that can be particularly appreciated in the Airspeed / Mach indicator and Radio Magnetic Indicator / Vertical Card Compass / Course Deviation Indicator instruments. An advantage of 3D instrumentation is the way it lights up, as we already wrote about. Also, the Virtual Cockpit loads with this model. There is no stutter, or pause, as the cockpit loads, it is already there.

Front Cockpit RT

Front Cockpit LT

RAT deployment

Testing Crew Altering Panel in Rear Cockpit

Gun Sight

Trace of ice on the canopy

3D Gauges have depth

Flares

Formation Lights

Among the systems properly replicated are the Saphire Turbine Starter, Exhaust Gas Temperature limiter, Fire Detection and Extinguishing, Main and Emergency Hydraulic Systems, Emergency Gear and Flap deployment systems, Flap Over-speed Protection, Cockpit Pressurization and Environmental controls, Electrical Buses and the Emergency Ram Air

Turbine Generator. Additionally, the jet has a working flare dispenser and operative fuel management with working external tanks on the models so equipped.

All of these systems are monitored by a fully functional crew alerting and warning system. A pilot's failure to heed cautions messages and warnings will result in the system eventually breaking down, including engine failure / fire if temperature limits are ignored long enough.

The L39 has limited ice and rain protection, as well as the ability to detect ice and automatically activate its systems. Which brings us to yet another "first," we had not seen before this product.

Ice and Rain

Yes, it is true, raindrops have now returned to Flight Simulator. Not only do Lotus Simulation's innovative landing lights illuminate the rain, the drops hit the canopy and run back. The drops appear to respond to changes in airspeed and slip angle. They aren't perfect, but the fact they are there at all surprised me. Also, you just have to see how the airframe gets wet and gets icy.

Unfortunately what my pictures did not show was the fine crystalline particles that build up on the canopy in ice. With FSX's bloom effect, adverse weather is truly beautiful in this L39.

Wet Wing | Raindrops

Getting Frosty	A Little Canopy Ice

Sound

Christoffer Petersen of Turbine Sound Studios prepared the sound file. His work on the engine sound of the AI-25 TL twin-shaft turbofan engine is particularly good. The sound file is very distinct depending on where you are in relation to the aircraft. At the front you distinctly hear the engine's compressor whine, while in the rear you hear the turbine's "thunder" as the nearly supersonic expanding gas flow would sound as it hits and mixes with the relatively motionless ambient air. On start and shutdown I think we are hearing bleed air relief valves venting.

Of course there are also numerous sound effects for the aircraft systems operation. One of my favorite is the operation of the Sapphire turbine air starter's automatic operation. There are also "clunks" for the deployment of the turbine air generator and a nice whoosh as you inflate the canopy seal.

The jet is typically Soviet simple when it comes to avionics, so don't expect Ground Proximity Call Outs, or Aural Warnings. Although the designer left out the rather funky Soviet style control panel for the G Suit, they did model the sound of the pump which can be heard from the external view more than in the virtual cockpit. The pump is a useful effect for G loading and provides a cue that your demands on the wing are likely causing the aircraft to bleed off speed, as a precursor to a stall if you do not release angle of attack.

Summary / Closing Remarks

Yes, Lotus Film's L39 Albatros is as good as everyone is saying on the forums. The result of Mike Johnson's design discipline is to make FSX models faster, better looking, and reliable. This L39 Albatros is an instant classic and the first multiplayer aerobatic airplane this reviewer has ever asked his Editor to give an AvSim Award of Excellence to.

What I Like About The L-39

- The L39 is beautifully executed, makes great frame rates, and is very reliable
- The flight model is among the best ever made for a desktop simulation with the ability to enter and recover from spins realistically
- The "effects" on this aircraft are built in to the model making them consistent across a variety of user's computer configurations
- Designed for multiplayer and shared cockpit flying
- The Virtual Cockpit loads instantly with no stutter
- Good product support from a developer who is active on the enthusiasts web boards
- Just an absolute ball to fly

What I Don't Like About The L-39

- Nothing, we'll be too busy online racing, flying in formation, teaching in shared cockpit mode or trying to do synchronized flat spins with FS Recorder

Printing

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L-39 Albatros

(adobe acrobat required)

Comments?

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