

Vixen Flight Report

Maiden Flights Saturday April 25th at Titusville Pennsylvania Airport

Winds out of North, less than 8 MPH, temperature low 50's F

Runway is in a north south configuration

Prototype Equipment Install: Rich Miller

Pilot: Jim Hiller

Radio: Jeti DS-16

Turbine: Jet Central Rhino SP (42 Lbs)

Gyro: Cortex

Initial Dry Weight: 38 Lbs

Radio Setup:

Three flight modes programmed, with separate trims settings for major flight controls.

- Normal Flight
- Take Off Flap
- Landing Flap

- Aileron Expo 30%
- Elevator Expo 30%

Pre Flight:

- Preflight run ups of turbine showed that the external surfaces of fuselage were cool to touch in the aft areas.

Initial Flight:

- Gryo not engaged.
- Take off roll relatively short to rotation point.
- Initial C.G. was at 5" behind centerline of main spar, this yielded a slightly tail heavy configuration which was evident during the landing sequence.
- Slight Pitch change with throttle settings (aft C.G. issue)
- Elevator and aileron throws needed to be cut down slightly.
- Jim reported that the nose wants to tuck in turns, turned on gryo and it helped remove this tendency.
- The main flaps were deployed however this required a great deal of elevator down input, it was decided not use flaps for the first landing. (aft C.G. issue)
- Landing was smooth and a bit long with no flaps deployed.

Second Flight:

- A battery with a mass of 389 g (13.7 oz) was placed in the pocket area next to the front nose wheel to move C.G. forward.
- Adjustments to reduce the elevator and aileron throws were made and the second flight was flown with the added nose weight, Jim reported that the C.G. was better but still needed more nose weight.
- Inverted flight still had a slight climb at neutral elevator stick input.
- The flight envelope was explored (slow speeds at a safe altitude) to discover any bad stall tendencies; Jim reported that it stalls well, positive right side up stalls are as good as one should expect with a high performance model, slowly pull up elevator and first it starts to bob the nose up and down with no tip break, but continue pulling hard elevator and the wing finally quits flying completely and breaks left or right, yaw dependent. Inverted, upside down stalls were as expected, mild break with tip stall. Both positive and negative G stalls recover quickly with reduction of elevator control. Slow flight felt positive, with no unusual habits.
- Jim reported that loops, either positive G or negative G are straight and solid, loops are about the same size in either direction, good for confident looping aerobatics regardless of inside or outside loops.
- Knife edge flight was explored, rudder has plenty of authority. Jim reported that knife edge was very good, held altitude well, tracked well, but with the leading edge sweep roll coupled to elevator input when hard rudder is applied for knife edge, pull elevator Vixen rolls in direction of rudder input, push elevator she rolls opposite of rudder input, again as expected with leading edge sweep.
- Initially, crow was programmed into the ailerons with the deployment of full flaps, Jim reports this seemed to cause too much lift. (Note: the aft C.G. could have also caused this)
- Aileron rolls not smooth, needs aileron differential programmed.

Third Flight:

- A second battery with a mass of 389 g (13.7 oz) was placed in the pocket area on the other side of front nose wheel to move C.G. further forward.
- Crow was removed from the mix.
- Aileron differential programmed, final settings will be reported in Post Flight results. Jim reported that aileron differential is required to straighten the roll, ended up I believe about 85%, not unusual for a low wing airplane.
- Elevator expo cut to 15%
- Take off normal, distance is not very long to rotate, climbs out very nice.
- Inverted flight was reported to have a very slight amount of decent at neutral elevator stick input. Jim feels that this now should be the aft most recommended C.G. Final setting will be reported in Post Flight results.
- Full throttle flight was investigated; the airframe appears to be pitch stable across the speed envelope with no bad tendencies. Jim reported that trim change with speed was a slight dive at full throttle high speed flight, maybe equivalent to 1 click of up trim to correct, again suspect a bit further forward CG can be used to correct. Overall trim change with speed change were minimal, very nice.
- With the C.G. very close, the final elevator trims were programmed into the flight modes. Final settings will be reported in Post Flight results.
- Airbrake deployment investigated, caused nose pitch up, trimmed to compensate.
- Low slow flybys performed airframe stable and smooth.
- Full dirty low slow flybys performed, airframe stable and smooth, required around ¼ to 1/3 throttle to maintain speed, drag reported to be very good.
- Landings very smooth and short with full flaps and air brake deployed.

Fourth through sixth flights:

- Jim performed aerobatic maneuvers getting comfortable with airframe.
- Had a flight emergency, low voltage reported in telemetry*, decided to manually shut down turbine and expedite landing, full flaps and airbrake deployed , very good decent rate, landing smooth with short roll out.

* Cause determined to be due to flaps and air brakes being deployed at too great of an airspeed causing excessive current draw on the linear regulator, regulator will be changed to larger capacity or a second one added for just flaps and airbrake to isolate the receiver voltage.

Post Flight:

- Jim stated in his overall evaluation, “very good flying airplane, similar to UltraBandit/Shockwave design but with a wing that seems better for upright to inverted aerobatics, something pattern flyers can appreciate.”
- Jim stated that the final CG makes for very good neutral flying, roll to inverted required little to no down elevator. High speed, full throttle did have a bit of down elevator trim suggesting a bit farther forward CG to be trialed. Landings at this CG were smooth, but one has to be careful not to over control the elevator on initial flare as easy to over control initial pull resulting in level flight followed only a weak tendency to drop the nose when reducing elevator input, will play with a bit more forward CG, I like this setup but definitely not recommended for everyone.
- Jim comment about the fin area, slow flight turns with the gyro turned off did result in slight yaw as aileron input was put in, similar to the old Crow Aviation series of sport jets, i.e. Razor, Predator. The gyro eliminated this tendency, however unless you’re an old pattern flyer you probably would not even notice it.
- Final C.G. of the day was found to be at 87.6 mm (3.45”) behind spar centerline, this is the aft most recommended C.G. (Projected Ultimate C.G. to be 3” aft of Spar CL)

Elevator Trim Settings	Flight Mode		T.O. Flaps		Landing Flaps
Surface measurement from center line at root	2.5 mm (.1”) Up		Level		6.3 mm (.25”) Down
Elevator Throw Settings	High Rate (Surface Raised)	High Rate (Surface Lowered)	Low Rate (Surface Raised)	Low Rate (Surface Lowered)	
Surface measurement from center line at root	23.6 mm (.93”)	21.6 mm (.85”)	21.6 mm (.85”)	17.8 mm (.70”)	
Aileron Differential Settings	High Rate (Surface Raised)	High Rate (Surface Lowered)	Low Rate (Surface Raised)	Low Rate (Surface Lowered)	
Surface measurement from center line at tip	10 mm (.40”)	8.9 mm (.35”)	8.9 mm (.35”)	7.6 mm (.3”)	
Rudder Throw Settings	High Rate		Low Rate		
Surface measurement from center line at base	38.1 mm (1.5”)		Not programmed		