Kestrel Flight Characteristics

[Estimated Using Propeller Data, Motor Data, Simplified Flow Simulation, & a Correction Factor]

Vehicle Details	
Total Weight:	1.6 Kg
Propeller:	10" Diameter
	4.5" Pitch
Motor:	MT2213-935KV
Battery:	3s 10 kmah
	500 grams

Estimated Forward Flight	0 mph	15 mph	30 mph	40 mph
Max AoA (deg)	58	47	20	11
Steady Flight AoA (deg)	0	0.4	2.7	11
Max Acceleration (m/s2)	15.9	9	3	0
Min Run Up Time (s)	0	0.54	1.64	2.36
RPM Druing Max AoA	~7000	~7000	~7000	~7000
RPM during steady flight	~5000	~5500	~5900	~7000

Manufacturer Provided Motor Performance Data *(note this is static data for a 1045 prop)*

Voltage	Current	Thrust (g)	Power	Efficiency (g/W)	RPM	Temperature (deg C)
11	1	130	11	11.8	2940	*Not Provided*
11	2	220	12	10	3860	*Not Provided*
11	3	290	33	8.8	4400	*Not Provided*
11	4	370	44	8.4	4940	*Not Provided*
11	5	430	55	7.8	5340	*Not Provided*
11	6	480	66	7.3	5720	*Not Provided*
11	7	540	77	7	5980	*Not Provided*
11	8	590	88	6.7	6170	*Not Provided*
11	9	640	99	6.5	6410	*Not Provided*
11	10	670	106	6.3	6530	43 (110 F)

Estimated Min Turn Radius		
15 mph	30 mph	40 mph
5 m	60 m	infinite

Estimated Flight Time	
Best Case:	40 min
Worst Case:	20 min
Initial Design:	15-30 min

BLUE ORIGIN

- Steady flight is when the vehicles forward force & vertical force balance with drag & weight
- Max AoA references the maximum angle of attack possible without losing altitude
- Flight time estimate made by estimated power draw values
- The angle of attack will be limited to 45 deg during actual flight due to the configuration of the long range sensors

Table and Estimations by Corbin Ledford