

Specs	Units	Cobalt Co50	Raptor	Phoenix
Source(s) of Information		https://en.wikipedia.org. http://www.cobalt-aircraft.com/ http://cobaltaircraft.com	www.raptor-aircraft.com	https://en.wikipedi https://web.archive
Manufacturer		Cobalt Aircraft	Raptor Aircraft	Freedom Aviation
Year First Flown		2015	planned for 2017	2007
Role		Next Generation Private Aircraft	"game changer", homebuilt	Utility aircraft, homebuilt
PERFORMANCE				
Service Ceiling	m	7620	8230	
Max Cruise Speed	km/h	463, max cruise @ FL250 407, economy cruise @ FL220	555, max cruise @ FL250 426, max range cruise	343 @ 65%
Cruise Speed	km/h			
Stall Speed (or Min Speed)	km/h	120	120	130
Landing Speed	km/h			148
Range Max Passengers	km			
Range Full Fuel	km	1850, economy cruise @ FL220	6667	2593
Rate of Climb	m/s	4.2	8.1	6.6
Time to Altitude		12 min to 10,000 feet "short to medium"	335	488
Take Off Distance over 50'	m			
Take Off Ground Roll	m	same		
Landing Distance over 50'	m	same		488
Landing Ground Roll	m	same	457	
Type of Runway			"fly off grass"	
OPERATIONAL LIMITATIONS				
Never Exceed Speed (IAS)	km/h			398
G Load Factor				
WEIGHTS & CAPACITIES				
MTOW	kg	1550	1633	
Standard Empty Weight	kg	708	816	
Empty Weight Fraction		0.457		
Max Useful Load	kg	842	816	
Max Payload	kg		665	680
Full-Fuel Payload	lbs	1200	996	750
Full-Fuel Payload	kg	544	452	340

Fuel Capacity	US gallons	109	124	125
Fuel Capacity	l	413	469	473
Fuel Weight	kg	297	365	341
Max Baggage	kg	30		
GEOMETRY				
WING				
Wing Location		low	mid	mid
Wing Area	m2		15.515	
Wing Loading	kg/m2		105	
Wing Span	m	9.144	10.287	10.490
Wing AR			6.82	
Ref Wing Area	m2	14.40	14.04	11.30
Ref Wing Loading	kg/m2	108	116	
Ref Wing Span	m	9.144	10.287	10.000
Ref Wing AR		5.81	7.54	8.85
Root Chord	m	2.250	2.060	1.630
Tip Chord	m	0.900	0.670	0.630
MAC	m	1.671	1.483	1.204
Wing Sweep (0.25 chordline)	deg	25.2	24.39	23.11
Ref Wing Taper Ratio		0.400	0.325	0.387
		NACA 747A315		
Wing Root Airfoil				
Wing Tip Airfoil		NACA 747A315		
		http://m-selig.ae.illinois.edu/ads/coord_database.html#N		
Airfoils Info Sourced from				
Wing LEX OUTBD WS	%	30	46	38
Wing LEX Root Chord	m	4.020	3.450	3.480
Wing LEX OUTBD Chord	m	1.845	1.417	1.246
Wing LEX Taper Ratio		0.459	0.411	0.358
Wing LEX Sweep (LE)	deg	58.60	47.85	55.23
Total Ref Wing Area (incl LEX)	m2	16.83	17.35	14.85
Total Ref Wing (incl LEX) Loading	kg/m2	92	94	
Wing Tip Type		blended winglet	blended winglet	blended winlet
Flap Rel. Area	%	n/a	n/a	
Flap Rel. Chord	%	n/a	n/a	
Flap INBD WS	%	n/a	n/a	
Flap OUTBD WS	%	n/a	n/a	
Aileron Rel. Area	%	11.36	14.11	
Aileron Rel. Chord	%	28.50	24.93	
Aileron INBD WS	%	52.00	26.93	
Aileron OUTBD WS	%	100.00	87.10	
Dihedral	deg	0	2.33	

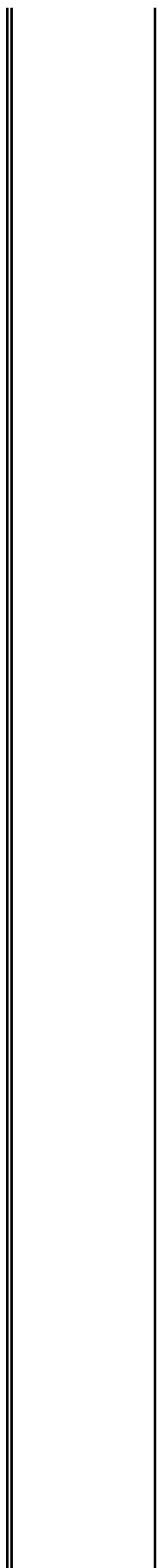
Incidence, root	deg	0.75		
Incidence, tip	deg	0.75		
CANARD				
Canard Area	m2	3.26	2.19	2.58
Ratio Canard Area / Wing Area		0.23	0.16	0.23
Canard Span	m	4.790	4.694	4.820
Canard AR		7.04	10.04	9.01
Canard Taper Ratio		1	0.78	0.78
Canard Sweep (0.25 chord line)	deg	0	1.96	8.22
Canard Incidence	deg	2.14		
Canard Root Chord	m	0.680		
Canard Tip Chord	m	0.680		
Canard MAC	m	0.680	0.470	0.538
Canard Root Airfoil				
Canard Tip Airfoil				
Airfoils Info Sourced from				
L_canard	m	5.500	3.386	3.613
Canard Tail Vol. Coefficient		0.744	0.357	0.685
Elevator Rel. Area	%	41.75	23.95	
Elevator Rel. Chord	%	0.41	40.48	
Elevator INBD WS	%	12.00	36.22	
Elevator OUTBD WS	%	95.00	98.42	
Dihedral	deg	0	0	yes
VERTICAL TAIL				
Type of VT		2 x fuselage fins	winglets	2 x midwing fins
VT Area		2.688	1.640	2.333
VT Span		1.690	1.665	1.200
VT AR		2.125	3.381	1.234
VT Taper Ratio		0.313	0.428	0.280
VT Sweep LE	deg	36	27.15	49.68
VT MAC	m	0.802	0.519	0.909
VT Root Airfoil				
VT Tip Airfoil				
Lvt		0.901	1.666	1.504
VT Tail Vol. Coefficient		0.005	0.006	0.012
Rudder Rel. Area	%	32.50	28.09	
Rudder Rel. Chord	%	50.11	28.34	
Rudder INBD WL	%	13.61	9.31	
Rudder OUTBD WL	%	100.00	100.00	

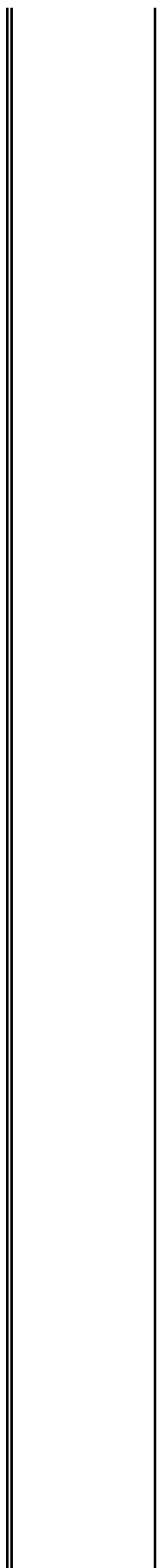
Dihedral ("-INBD, "+"OUTBD)	deg	19.00	8.96	
Incidence ("-INBD, "+"OUTBD)	deg			-2.51
WINGLETS (if additional to VT)				
Total Winglets Area		2.356		
Winglet Span		1.870		
Winglet AR		2.969		
Winglet Taper Ratio		0.400		
Winglet Sweep (0.25 chordline)	deg	23		
Winglet MAC	m	0.669		
Winglet Root Airfoil				
Winglet Tip Airfoil				
Dihedral ("-INBD, "+"OUTBD)	deg			
Incidence ("-INBD, "+"OUTBD)	deg			
Length	m	9.144	6.757	6.86
Height	m	3.048	3.048	2.21
Cabin Length	m			3.300
Cabin Width	m		1.575	1.300
Cabin Height	m		1.295	1.100
Baggage Capacity	m3			
PROPULSION				
Configuration		pusher	pusher	pusher
Engine		1 × TSIOF 550-D, FADEC	Audi 3.0L V6 TDI, FADEC	1 × Continental IO- 550
Power	hp	350	300	310
Engine Dry Weight	kg	285	216	
Power Loading	kg/hp	4.43	5.44	
Propeller				
BSFC	lbs/BHP			
Max Cruise Fuel Flow	l/h	109	42	
Max Range Fuel Flow	l/h	81	26	57
LANDING GEAR				
Type of Gear		RG	RG	RG
Wheelbase	m	3.910		
Wheel Track	m	2.650	2.718	
Main Wheels				
Nose Wheel				
OTHER SPECS				
Max Seating		4+40kg child	4 or 5	4
Crew			1	1

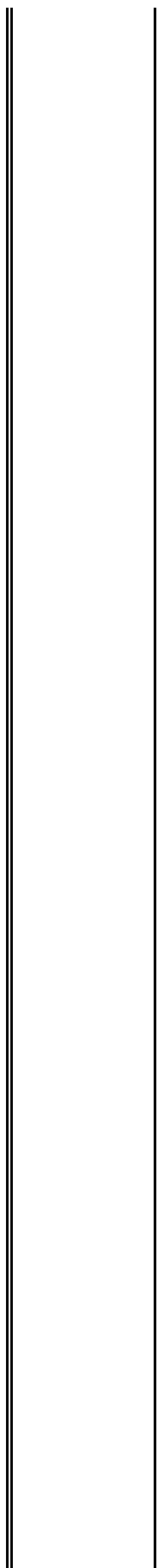
Seating Configuration		2+2/3	2+2/3	2+2
Occupant Height Range	feet		5' to 7'	
Occupant Height Range	cm		152...213	
Pressurization	psi	no		5.5
Oxygen System		yes		
Recovery System		airframe chute	airframe chute	
Structural Materials		all-composite	all-composite, no core on spar and ribs	all-composite
Avionics		Garmin G3X Touch	"latest Garmin"	
Primary Control		side stick	side yoke	
Airbrakes		yes	yes	
Air Conditioning		optional		
Miscellaneous			Variable Intake, de- icing, retractable step	
Price, USD			655,000	130,000

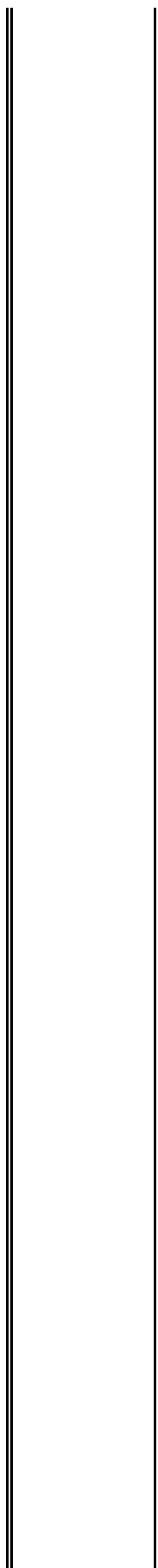
Fill Colors Usage:

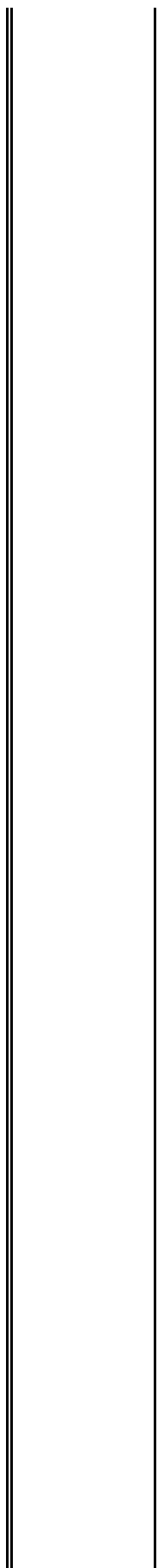
- calculated values
 - data derived from images
 - doubtful or questionable figure
- otherwise data entered are source data

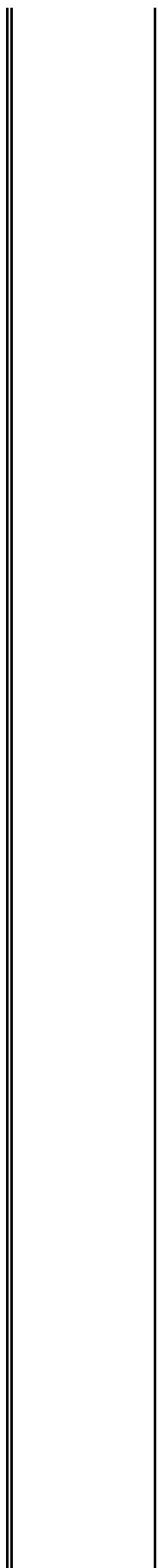


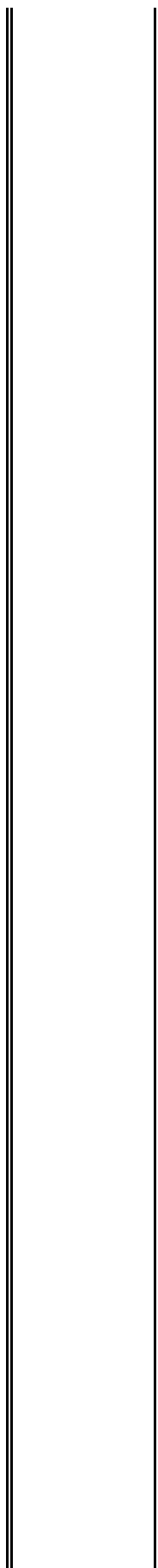


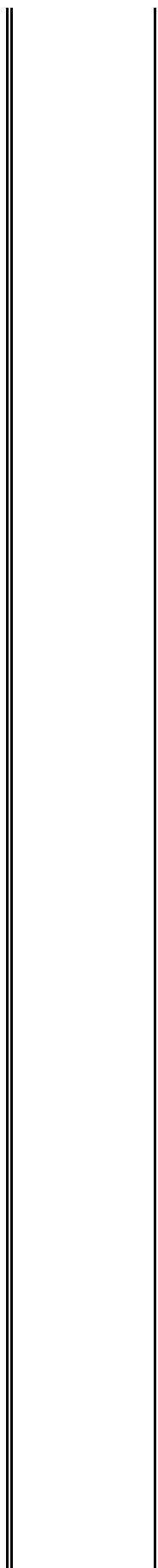


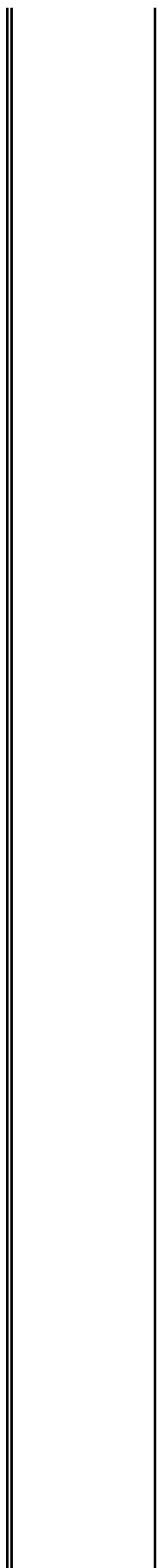


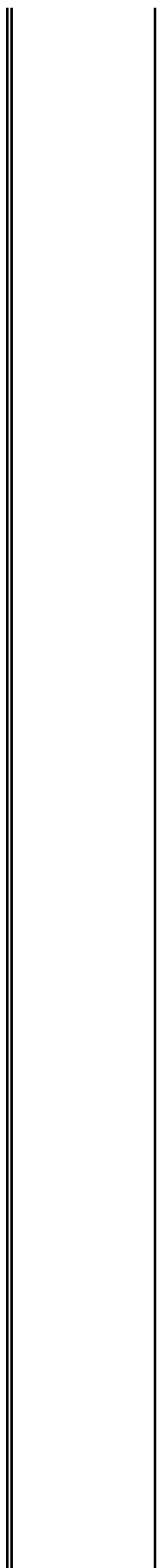


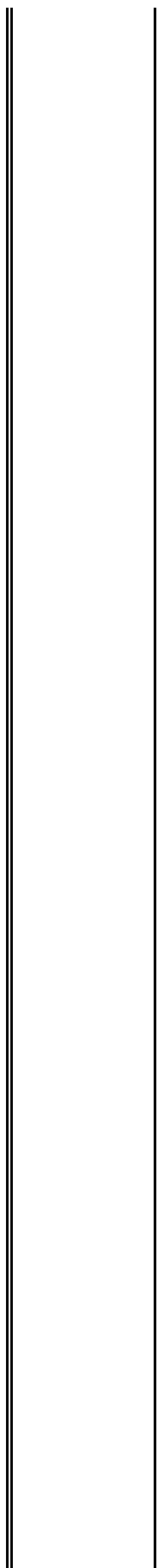


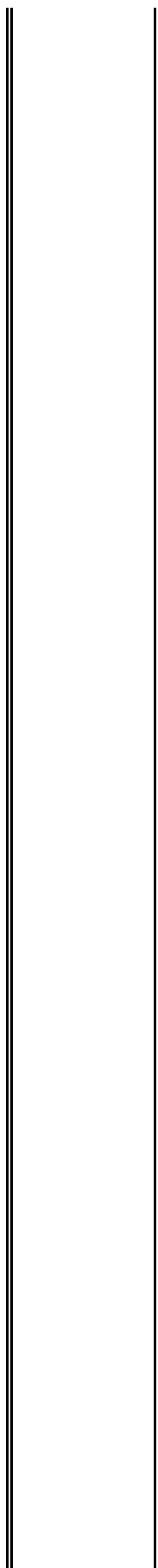


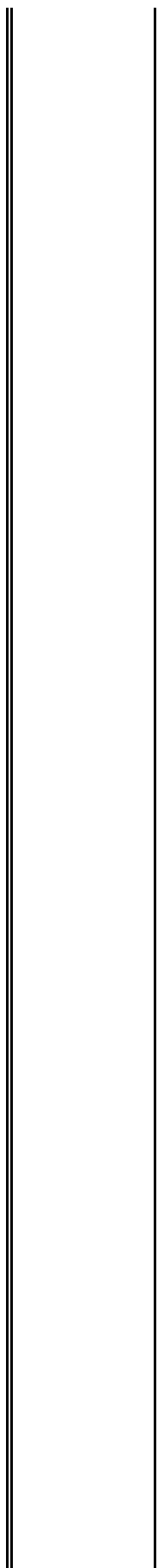


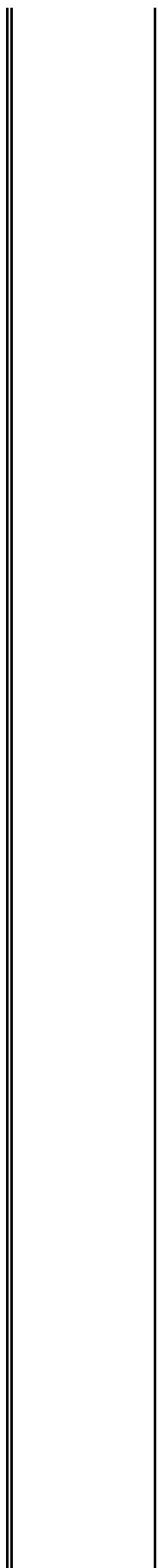


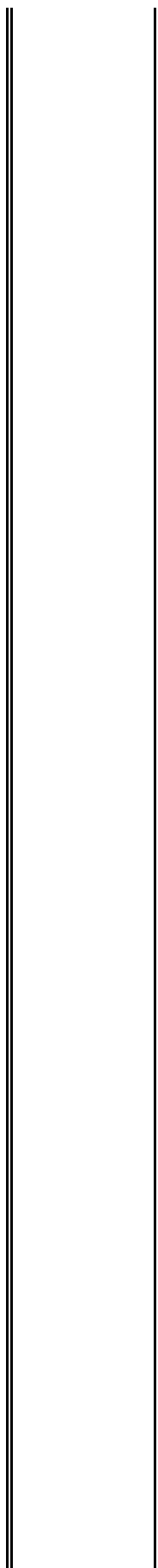


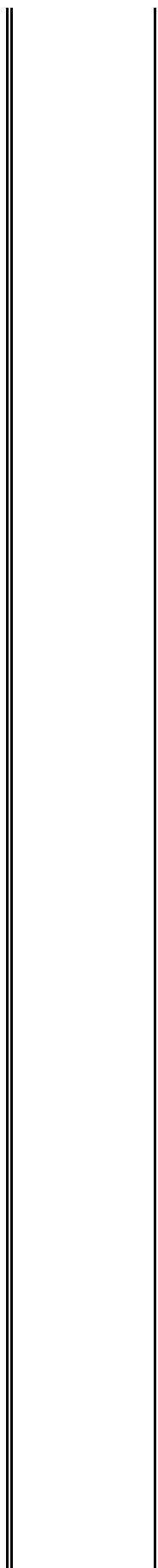


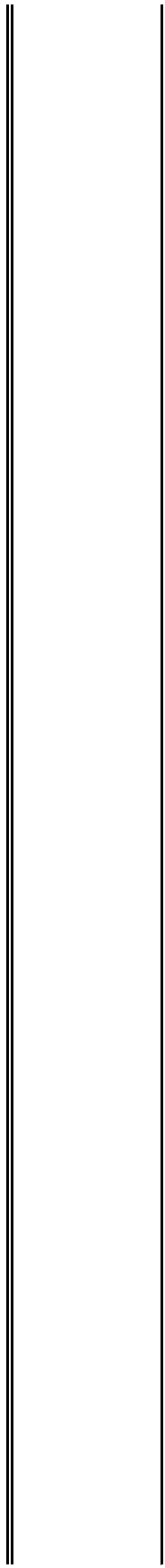












Velocity XL	Velocity SE	Cozy MK IV	Cozy III	Long-EZ	
https://en.wikipedia.org/wiki/Velocity_XL	https://en.wikipedia.org/wiki/Velocity_SE	https://en.wikipedia.org/wiki/Cozy_MK_IV	https://en.wikipedia.org/wiki/Cozy_III	https://en.wikipedia.org/wiki/Long-EZ	
http://www.velocityaircraft.com	http://www.velocityaircraft.com			Burt Rutan's Race to Build the Long-EZ	
Velocity, Inc	Velocity Aircraft	Aircraft Spruce & Specialty Co	Co-Z Development Company	Rutan Aircraft Factory	
homebuilt	1997 homebuilt	1995 homebuilt	1993 homebuilt	1982 homebuilt	1979
380 @ 75%	6096 346 @ 75%	6096 354 @ 75%	6100 290 @ 75%	5500 296 @ 75%	6706
				232 @ 40%	
	120 139	111 130			
1852 @ 65%	1852 @ 65%	1852 @ 75%	1852 @ 75%	3170 @ 40%	
	7.62	6.096	6.1	4.1	6.9
	396	427			253
	457	457			207
+9/-7	370 +12/-7	370			
	1270 771	1043 590	930 476	680 411	601 340
	0.607 499	0.565 454	0.512 454	0.604 269	0.566 261
	679 308	639 290			262 119

70	60	52
265	227	197
191	164	142

mid	mid	mid	mid	mid
11.38	9.48	8.2	8.88	7.617
112	92.2	113	77	79
9.449	8.941	8.565	8.000	7.955
7.84	8.44	8.95	7.21	8.31
11.58				7.28
110				83
9.280				7.870
7.44				8.51
1.835				1.350
0.660				0.500
1.340				0.990
22.22				20.09
0.360				0.370
Eppler 1230 mod	Eppler 1230 mod	Eppler 1230 mod	Eppler 1230 mod	Eppler 1230 mod

same	same	same	same	same
http://m-selig.ae.illinois.edu/ads/aircraft.html#canards	http://m-selig.ae.illinois.edu/ads/aircraft.html#canards	http://m-selig.ae.illinois.edu/ads/aircraft.html#canards	http://m-selig.ae.illinois.edu/ads/aircraft.html#canards	http://m-selig.ae.illinois.edu/ads/aircraft.html#canards
41				36
3.020				2.415
1.356				1.048
0.449				0.434
47.70				49.73
13.82				8.77
92				69
winglet	winglet			winglet
n/a				n/a
n/a				n/a
n/a				n/a
n/a				n/a
5.68				5.50
15.47				14.64
36.64				34.18
71.12				74.08
1.32				0

0
0

2.12	1.84
0.18	
4.775	4.166
10.77	9.43
1	1
0	0

1.19
0.16
3.470
10.12
1
0
0

0.43

Roncz R1145MS

Roncz R1145MS

Roncz R1145MS

Roncz R1145MS

0.325

GU25-5(11)8 or
Roncz R1145MS

same

<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>

2.766
0.378
25.25
36.05
21.36
93.61
0

same

<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>

same

<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>

same

<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>

same

<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>

2.605
0.430
16.82
21.54
17.58
100.00
0

winglets

1.500
1.445
2.783
0.423
28.05
0.533

winglets

winglets

1.407
1.405
2.806
0.426
27.55
0.511

1.294
0.006
25.49
30.61
0.00
100.00

1.296
0.012
14.19
51.64
-7.69
9.69

0

-2.08

6.1	5.8	5.151	5.1	5.121
2.36	2.36	2.408	2.4	2.408
2.388	2.134			
1.207	1.067			
1.105	1.080			

pusher 1 × Continental IO- 550	pusher 1 × Lycoming IO- 360	pusher 1 × Lycoming O-360	pusher 1 × Lycoming O-235	pusher 1 × Lycoming O-235
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310	200	180	120	115
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4.10	5.22	5.17	5.67	5.23
reversible 5-bladed MT. MTV-5 (???)	3-bladed Catto			

both FG and RG	both FG and RG	RNG, FMG	
2.794	2.54		2.324
2.032	2.032		1.420

4	4	4	3	2
1 1 or 2		1	1	1

2+2

2+2

2+2

tandem

all-composite

all-composite

all-composite

all-composite

all-composite

side stick

yes

VariEze	Jetcruzer 500	MIN	MAX	Average	Atlantica
https://en.wikipedia.org/wiki/Burt_Rutan's_Race_to_Rutan_Aircraft_Factory	https://en.wikipedia.org/wiki/Advanced_Aerodynamics_and_Structures_Inc				http://www.wingco.co https://en.wikipedia.org/wiki/Wingco
homebuilt	1975 turboprop light civil transport	1997			2002 BWB 5 seat homebuilt, flying wing
	6248	9100			3000...5500
	311	556			444
	266				
	89				107
1690 @ 40%		2936			3334
	7.6	4.1	8.1	6.4	10.2
	262	530	253	530	384
	305	436	207	488	392
					407
+2.5/-1.5					
	476	2495			1134
	265	1338			567
	0.557	0.536	0.457	0.607	0.551
	211	1157			567
	297				708
	135				321

28
106
76

90
341
246

mid	low				
4.98	17.94				
96	139	77	139	102	
6.767	12.850				
9.19	9.20	6.82	9.20	8.25	
4.92	19.97				
97	125	83	125	106	
6.560	12.850				
8.75	8.27	5.81	8.85	7.88	
1.120	1.948				
0.380	1.160				
0.811	1.588				
24.14	18.84	18.84	25.20	22.57	
0.339	0.595	0.325	0.595	0.397	

8.534

NASA GA(W)-1 mod NACA 23012

same	same				
http://m-selig.ae.illinois.edu/ads/aircraft.html#canards	http://m-selig.ae.illinois.edu/ads/aircraft.html#canards				
24	37	24	46	36	
2.990	2.650				
0.940	1.660				
0.314	0.626	0.314	0.626	0.436	
63.79	33.84	33.84	63.79	50.96	
6.42	21.62				
74	115	69	115	89	

Whitcomb's winglet winglet

n/a	8.88
n/a	21.03
n/a	38.13
n/a	82.65
2.13	7.29
21.00	27.29
80.49	53.23
97.26	82.65
-4.15	0

1.21	3.71			
0.25	0.19	0.16	0.25	0.20
3.460	5.820			
9.92	9.13	7.04	10.77	9.43
1	0.75	0.75	1.00	0.91
0	0	0.00	8.22	1.27
0	2.66			

0.37	0.715
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GU25-5(11)8 NASA LS(1)-
0417MOD

same same
<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>
<http://m-selig.ae.illinois.edu/ads/aircraft.html#canards>

2.705	5.563			
0.818	0.651	0.357	0.818	0.580
23.79	19.57	16.82	41.75	25.19
28.38	23.99	0.41	40.48	25.14
14.57	21.65	12.00	36.22	20.56
93.64	97.25	93.61	100.00	96.32
0	0	0	0	0

winglets winglets

0.656	2.672			
0.875	1.670			
2.334	2.088	1.23	3.38	2.39
0.364	0.455	0.28	0.45	0.38
37.26	19.76	19.76	49.68	32.21
0.446	0.838			

1.21	0.272			
0.017	0.001	0.001	0.017	0.008
16.21	20.31	14.19	32.50	22.80
29.45	30.77	28.34	51.64	36.82
0	11.68	-7.69	13.61	4.48
43.43	76.05	9.69	100.00	71.53

9.24	-6.045	-6.05	19.00	4.85
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4.328	8.590	7.315
1.494	3.170	
		2.438
		1.397
		1.080
		0.354

pusher 1 × Continental O- 200-B	pusher 1 × Pratt & Whitney Canada PT6A-66	pusher LOM super-charged
100	850	235
4.76	2.94	4.83
2.94	5.67	
4.77		
five blade constant speed Hartzell propeller		fixed or constant speed Performance or MT 3- blade

RNG, FMG	RG	FG or RG
2.400	4.340	
1.305	3.050	

2	6	5
1	1	

tandem		2+3
	yes	
all-composite	all-composite	airframe chute all-composite
		side stick
		toilet (???)
		250,000

Specific problems with the aircraft's noise, high stall speed, and center of gravity w

Sportster CFX_00

Sportster CFX_01

Sportster Aero

Sportster Aero

Next Generation Private
Aircraft

Next Generation Private
Aircraft

7600

7600

470, max cruise @ FL250

470, max cruise @ FL250

410, economy cruise @
FL220

410, economy cruise @ FL220

110

110

1829

2706

per FAR Part 23, normal
category

per FAR Part 23, normal
category (+4/-2)

1556

1241

716

571

0.460

0.460

840

670

540

370

1190

816

540

370

110	110
416	416
300	300
30	150

low	low	
		15.48
		80
		9.184
		5.45
	15.56	13.20
	100	94
	9.250	9.184
	5.50	6.39
	2.402	1.874
	0.961	0.750
	1.785	1.574
	25	19
	0.4	0.4
NACA 652-215, or NACA 23012, or NLF(1)-215M	NACA 747A315, or NACA 652-215, NACA 23012, or NLF(1)-215M	

same	same
	http://m-selig.ae.illinois.edu/ads/coord_database.html#N

30	30%
4.690	3.657
1.970	1.690
0.42	0.46
65.49	57.53
18.73	15.48
83	80

blended winglet	blended winglet
	slats???
	slats???
	slats???
	slats???

0	0
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0	0.75
0	0.75

3.89	2.41
0.25	0.18
4.089	4.250
4.30	7.49
0.75	0.75
5	3
TBD	2
1.087	0.648
0.815	0.486
0.957	0.571
NACA 65-415, or NASA LS(1)-0417MOD	NASA LS(1)-0417MOD or NACA 65-415, NACA 4412, NACA 101, Goe 387 - to be analyzed)
	same

5.354	4.871
0.750	0.565

0

0

TBD	Vertical Stabilizer
	1.261
	1.37
	1.488
	0.4
	39.3
	1.006
	NACA 63012A
	NACA 63012A
	0.857
	0.007

	1.374
	1.200
	2.096
	0.400
	30
	0.629

same as for wing

same as for wing

	0
	0

	8.580
	3.340

pusher	pusher
1 × TSIOF 550-D, FADEC	Lycoming TIO-540-A
350	310
285	231.78
4.44	4.00

109	83.28
81	56.78

RG	RG
3.900	2.600
2.650	2.600
6.00x6	6.00x6
5.00x5	5.00x5

4 2+2x75 teens

 $1/2$ $1/2$

2+2

2+1 or 2+2

no

no

yes

yes

airframe chute

airframe chute

all-composite

all-composite

ere not overcome before all work on it was suspended in 2002. Nearly 20 years of work had still not result

ed in a marketable aircraft.