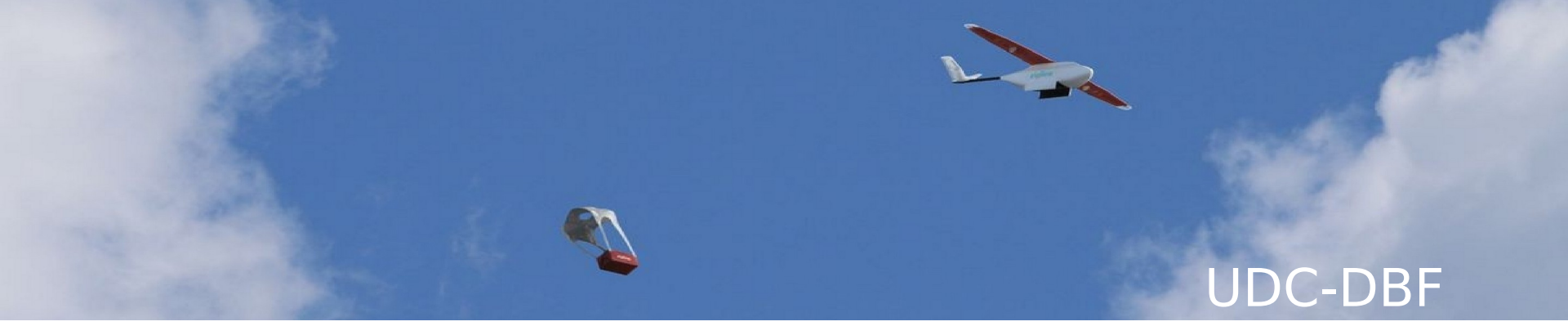

4th Design Iteration

Team Name: **الثُّرَيّا**

Note: lengths should be in (cm), angles in (deg).

Wing Information	
Airfoil	NACA 6415
Span	148 (cm)
Root Chord	30 (cm)
Tip Chord	30 (cm)
Offset	40 (cm)
AR	4.93
S_w	4400 (cm^2)
Incidence Angle	0
Twist	0
Dihedral	4 (deg)
Vertical Tail Information	
Airfoil	NACA 0009
Semi Span (Total Length)	20 (cm)
Root Chord	20 (cm)
Tip Chord	14 (cm)
Offset	6 (cm)
S_v/S_w	0.068182
AR_v	4.71
V_v	0.0680562
Incidence Angle	0
Tail Arm	65 (cm)
Shifted Length in Z-Direction	-7 (cm)
Horizontal Tail Information	
Airfoil	NACA 0009
Span	64 (cm)
Root Chord	20 (cm)
Tip Chord	20 (cm)
Offset	0
S_H/S_w	0.2955
AR_H	3.2
V_H	0.64
Incidence Angle	-2.0 (deg)
Tail Arm	65 (cm)
Shifted Length in Z-Direction	-7 (cm)

Propulsion System Information

Input					
Model Weight (Drive included or without)	2100g include drive				
Desired Flight speed	44.3 km/h				
Brushless Motor	Manufacturer	Model	Voltage Constant [KV]	No Load Current [A]	Resistance [ohm]
	ElectriFly	RimFire 0.15	1200	1.7	0.0415
Battery	Manufacturer	No. Of Cells	Voltage	Capacity [mAh]	C-Rating
	HRB	3	11.1	5200	50
Propeller Size (Diameter x Pitch)	10 x 4.7 in.				
Speed Controller (Current Rating Value)	60A				

Output	
Load	6.7 C
Mixed flight Time	10.5 min
Max. Current	33.43 A
Max. Power	383.4 W
Static Thrust	1618 g
Available Thrust [at the desired flight speed]	1151 g
Drive Weight	636 g
All Up Weight	2100 g
(Power/Weight) Ratio [Watt/lb]	85 W/lb - 187 W/kg
(Thrust/Weight) Ratio	0.77

Flight Phases

Phase 1 (payload isn’t deployed)	
MTOW	1.7 (Kg)
X_{CG}	8.8 (cm)
Static margin (%)	0.24
CL_{Cruise}	0.48
V_{Stall}	650 (cm/s)
V_{Cruise}	1320 (cm/s)
α_{Trim}	0.067 (deg)
Required Static Thrust	852.49 (g)
Required Dynamic Thrust (at V_{Cruise})	214.82 (g)
Phase 2 (payload is deployed)	
Mass	1.3 (Kg)
X_{CG}	8.8 (cm)
Static margin (%)	0.24
CL_{Cruise}	0.48
V_{Stall}	650 (cm/s)
V_{Cruise}	1150 (cm/s)
α_{Trim}	0.067 (deg)
Required Static Thrust	852.49 (g)
Required Dynamic Thrust (at V_{Cruise})	142.417 (g)

Very Important Notes

The wing is actually above the cg of the UAV by 7cm, and the tail is at the same level of the cg, or you can say the wing is at zero and both the tail and the cg is below by 7cm.