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Airframe Subsystem Requirements Matrix

ID	Rev.	Date	Description	Author	Checked By
AF-001	0.1	10-23-18	Initial Draft	Tyler Critchfield & Ryan Anderson	Derek Knowles
AF-001	0.2	11-06-18	Revisions for Final Submission	Tyler Critchfield	Ryan Anderson & Kameron Eves

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Product: UAS
Subsystem: Airframe

Market Requirements

Upper Acceptable	Ideal	Lower Acceptable	8 Looks decent	7 Fast and cheap rebuild	6 Capable of carrying UGV and water bottle	5 Complies with AMA safety code	4 Components are protected	3 Minimize flight path deviation	2 Capable of traveling an extended distance	1 Capable of flight for extended period of time	Importance	Performance Measures	Units
			1	3	3	9	9	9	9	9			
N/A	75	40							●	●	1	Battery life	Minutes
N/A	20	5			●				●	●	2	Lift-to-drag ratio	Unitless
1	1	0.2			●				●	●	3	Motor/prop efficiency	Unitless
50	4	0			●				●	●	4	Airframe weight	Kilograms
30	15	10			●				●		5	Average flight speed	Meters/second
20	10	N/A			●			●			6	Stall speed	Meters/second
-0.01	-0.05	-0.1						●			7	Spiral stability eigenvalue	Unitless
0.2	0.1	0						●			8	Static margin	Unitless
0.15	0.1	0.05						●			9	Cn,beta (yaw)	Unitless
0	-0.1	-0.15						●			10	Cl,beta (roll)	Unitless
0	0	0					●				11	Number of components that fall off the plane	Unitless
0	0	0		●			●				12	Number of damaged components on landing	Unitless
0	0	0				●					13	Number of AMA safety code violations	Unitless
1	0.5	0.4			●						14	Lift coefficient	Unitless
12000	10000	8000			●						15	Storage volume	Cubic centimeters
4	0	0		●							16	Time to rebuild	Hours
10	10	5		●							17	Focus group ease of repair	1-10 scale
10	10	5	●								18	Focus group coolness rating	1-10 scale

Figure 1: Airframe subsystem requirements matrix. Note that sometimes ideal values are unrealistic; rather, they are ideal. E.g., the ideal required build time is not time at all. Realism will be incorporated into target values in a future version of the Requirements Matrix.

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