Brigham Young University

AUVSI Capstone Team (Team 45)

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	Concept Development	Tyler Critchfield	Ryan Anderson & Kameron Eves
AF-001	1.1	2-12-19	Subsystem Engineering	Tyler Critchfield	Ryan Anderson

1 Introduction

Figure 1 (see next page) shows our updated Requirements Matrix for the Airframe subsystem. Section E has been updated with target, predicted, and measured values for our performance metrics. Some metrics were determined using models (see artifact AF-011), but could not be easily measured empirically. These metrics were placed in the predicted row and the measured value was assigned "N/A".

	Product: UAS Subsystem: Airframe	Units	Minutes	Unitless	Unitless	Kilograms	Meters/second	Meters/second	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Cubic centimeters	Hours	1-10 scale
	Market Requirements	**Performance Measures**	Battery life	Lift-to-drag ratio	Motor/prop efficiency	Airframe weight	Average flight speed	Stall speed	Spiral stability eigenvalue	Static margin (with payload)	Cn,beta (yaw)	Cl,beta (roll)	Number of components that fall off the plane	Number of damaged components on landing	Number of AMA safety code violations	Lift coefficient	Storage volume	Time to rebuild	Focus group ease of repair
	Importance		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Capable of flight for extended period of time	9	●	●	●	●													
2	Capable of traveling an extended distance	9	●	●	●	●	●												
3	Minimize flight path deviation	9						●	●	●	●	●							
4	Components are protected	9											●	●					
5	Complies with AMA safety code	9													●				
6	Capable of carrying UGV and water bottle	3		●	●	●	●	●								●	●		
7	Fast and cheap rebuild	3												●				●	●
		Lower Acceptable	40	5	0.2	0	10	N/A	-0.1	0	0.05	-0.15	0	0	0	0.35	6000	N/A	5
		Ideal	75	20	1	2	13	10	-0.05	0.1	0.1	-0.1	0	0	0	0.5	10000	0	10
		Upper Acceptable	N/A	N/A	N/A	10	30	20	0.4	0.15	0.15	0.1	0	0	0	1	12000	24	10
		Target	60	7.5	0.35	4.5	14	10	0	0.1	0.1	0	0	0	0	0.7	8000	10	8
		Predicted	60	7.5	0.405	4.5	14	11	0.3187	0.06	0.10452	0.06032	0	0	0	0.7	7974	10	8
		Measured	50	5	N/A	4.5	14.5	11	N/A	0.057	N/A	N/A	0	0	0	0.7	10766	8	6

Figure 1: The updated requirements matrix for the airframe subsystem, with section E included (target, predicted and measured values for performance measures.)