



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 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 | |
|---|--|------------------|----------|
| Performance Measures | | Importance | |
| | | 1 | 2 |
| Market Requirements 1 Capable of flight for extended period of time 2 Capable of traveling an extended distance 3 Minimize flight path deviation 4 Components are protected 5 Complies with AMA safety code 6 Capable of carrying UGV and water bottle 7 Fast and cheap rebuild 8 Looks decent | Battery life | 9 | 1 |
| | Lift-to-drag ratio | 9 | 2 |
| | Motor/prop efficiency | 9 | 3 |
| | Airframe weight | 9 | 4 |
| | Average flight speed | 9 | 5 |
| | Stall speed | 9 | 6 |
| | Spiral stability eigenvalue | 9 | 7 |
| | Static margin (with payload) | 9 | 8 |
| | Cn,beta (yaw) | 9 | 9 |
| | Cl,beta (roll) | 9 | 10 |
| | Number of components that fall off the plane | 9 | 11 |
| | Number of damaged components on landing | 9 | 12 |
| | Number of AMA safety code violations | 9 | 13 |
| | Lift coefficient | 9 | 14 |
| | Storage volume | 9 | 15 |
| | Time to rebuild | 9 | 16 |
| | Focus group ease of repair | 9 | 17 |
| | Focus group coolness rating | 9 | 18 |
| | | Lower Acceptable | Ideal |
| | | Upper Acceptable | Target |
| | | Predicted | Measured |
| | | 50 | 60 |
| | | 5 | 7.5 |
| | | N/A | 0.405 |
| | | 4.5 | 4.5 |
| | | 14.5 | 14 |
| | | 11 | 11 |
| | | N/A | 0.3187 |
| | | 0.057 | 0.06 |
| | | N/A | 0.10452 |
| | | N/A | 0.06032 |
| | | 0 | 0 |
| | | 0 | 0 |
| | | 0 | 0 |
| | | 0.7 | 0.7 |
| | | 10766 | 7974 |
| | | 8 | 10 |
| | | 6 | 8 |
| | | | 8 |

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