

Spring Midterm Presentation



FCAAP: AIAA Design Build Fly

Instructor Dr. Kamal Amin

Project Advisors Dr. Farrukh Alvi Dr. Chiang Shih

> <u>Sponsor</u> FCAAP

TEAM 16: Lee Becker – Jordan Benezra – Terry Thomas – Will Watts [2/12/13]





Presentation Outline



- Fall Review
 - Overview of Competition
 - Previous Design
- Midpoint Review
 - Current Prototype
 - Design Changes
 - Fuselage
 - Internal Store Attachment Method
 - Build Process
 - Wing
 - Internal / External Stores
- Future Work
- Schedule
- Budget



Competition Overview



- Held in Tucson, Arizona in April, 2013
- Score based upon Three flight missions, aircraft parameters, and written report.
- Mission 1: Max completed laps in given time
- Mission 2: Max internal stores for 3 laps
- Mission 3: Random missile configuration 3 laps, minimum time
- Written Report: 60-Page maximum, Due 2/25/13



Aircraft Specifications



•Wing Span: 78 inches

•Vertical Tail Span: 10.25 inches

•Horizontal Tail Span: 24 inches

•Overall Length:~ 60 inches (flight test dependent)

•Max Empty Weight: 3.5 pounds



Previous Aircraft Prototype









Current Aircraft Prototype







6



Fuselage Construction



<u>Air-Frame</u>

Carbon Fiber 0.5 x 0.125 inch

Bass Wood 8.0 x 18.0 inch

Tail Connection

Carbon Fiber Tube 0.75 inch I.D.







Internal Store Attachment



Light weight plastic tubing

- single piece design eliminates complicated attachment mechanisms
- provides secure grasp on entire outer surface of "Minimax" internal stores
- prevents unwanted axial motion during flight





Construction Process







<u>Future Work</u>



Short Term

- Awaiting Carbon fiber shipment to begin fuselage construction
- Finish wing fabrication : servo installation, control surfaces and monokote
- Complete external store attachment design
- Finalize competition design report

Long Term

- Complete final prototype and fabricate spare wing/tail
- Flight test and optimization
- Compete successfully!







Task Name	Duration	Start	Finish	Jan '13	Feb	'13	Mar '13		Apr '1	3	N	lay '	13
				30 6 13 20 27	3	10 17 24	3 10 17 2	24 3	1 7	14 21	28	5	12
Final Detailed Design	76 days	Fri 1/4/13	Fri 4/19/13							-			
Restated Scope Deliverable	0 days	Thu 1/17/13	Thu 1/17/13	♦ 1/17									
Team Evaluation	0 days	Fri 1/25/13	Fri 1/25/13	♦ '	1/25								
Midterm Presentation	25 days	Thu 1/17/13	Wed 2/20/13										
Manufacturing	31 days	Wed 1/9/13	Wed 2/20/13										
Final Design Decision	34 days	Fri 1/4/13	Wed 2/20/13										
Final Design Report Writing	14 days	Tue 2/5/13	Fri 2/22/13										
Component Testing	41 days	Fri 1/4/13	Fri 3/1/13										
Prototyping	51 days	Fri 1/4/13	Fri 3/15/13				h						
Team Evalutation	0 days	Wed 3/13/13	Wed 3/13/13				3/13	;					
Discussion of Prototyping	0 days	Tue 3/5/13	Tue 3/5/13				3/5						
Operation Manual Report	14 days	Mon 2/25/13	Thu 3/14/13			Ĭ							
Design Presentation #2	0 days	Fri 3/15/13	Fri 3/15/13				🐳 3/1	5					
Pre-Competition Flight Optimization	46 days	Fri 2/15/13	Fri 4/19/13										
Open House Presentation	0 days	Wed 4/10/13	Wed 4/10/13						•	4/10			
AIAA DBF Competition	3 days	Wed 4/17/13	Fri 4/19/13										
Final Staff Meeting	0 days	Thu 4/25/13	Thu 4/25/13							- 🍾	4/	25	
Final Grade Reported	0 days	Tue 5/7/13	Tue 5/7/13									• •	5/7



Current Expenditures



Broduct	Size (inches unless specified) or	Quanity	Unit Drice (¢)	Total (\$)	
Product	Product describtion	Quantity	Unit Price (\$)		
	3X36X1/32	8	0.65	5.2	
Wood	3X36X1/16	10	1.21	12.1	
	3X36X1/8	6	1.72	10.32	
	3X48X1/8	20	1.94	38.8	
Carbon Fiber	3mm X 750 mm	2	1.49	2.98	
	0.25x0.25x80	2	5.35	10.7	
	0.25x0.25x24	3	19.8	59.4	
	ID 0.75 x 48	1	54	54	
	0.125x0.5x48	8	13.5	108	
Motors	860kV 22A	1	15.58	15.58	
	1320kV	1	20.15	20.15	
	1100kV	1	9.34	9.34	
Propellers	Various Pitch and Diameter	15	3	45	
Servos	Hs 325 Hb	6	12.99	77.94	
Model Rockets	Der Red Max	4	12.99	51.96	
	Mini Honest John	4	8.49	33.96	
	Hi-Flier	2	6.99	13.98	
	Mini Max	4	8.99	35.96	
Hardware	Nuts/Bolts washers misc.			30	
	Batteries/ Charger/ Wires			40	
	Tools needed for fabrication			60	
	Monokote	3	13	39	
Shipping	Various Items			300	
Total Spent to Date					







