



The Wright Stuff

Sponsorship Presentation
SAE Aero Design West 2013

Aaron Lostutter
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Jacob Vincent

Aero Design Team

- Students:
 - Aaron Lostutter
 - Adam Nelessen
 - Brandon Perez
 - Zev Vallance
 - Jacob Vincent
- Faculty Advisors:
 - Dr. John Tester
 - Dr. Tom Acker



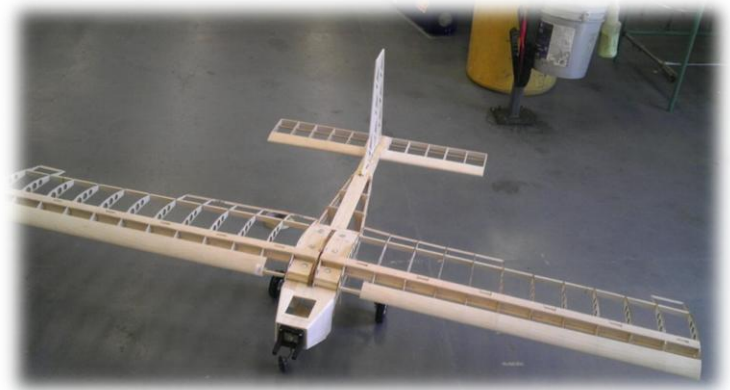
What is Capstone?

Strengthening our abilities to engineer through:

- Numerical methods
- Statistics
- Economics
- Computer-aided design
- Production techniques
- Teamwork and organization
- Documentation and presentation

Aero Design West

- Where: Van Nuys, CA
- When: April 12-14, 2013
- 75 teams
- Scoring
 - Report
 - Presentation
 - Flight Demonstration



Aero Design West

- **Mission Constraints:**
 - Takeoff within 200'
 - Full 360° circuit
 - Land intact within 400'
- **Design Constraints:**
 - All dimensions combined $\leq 225''$
 - Standard, unmodified engine
 - No fiber-reinforced plastics (FRP)

What Propels Us?

- We are passionate about aerodynamics and mechanical design
- We want to prove that we can be competitive against teams from well-established and highly-funded schools
- Creativity before capital

Objective

Design and manufacture a model aircraft to carry at least 25 lbs of payload.



Timeline

ID	Task Name	Duration	Start	Finish	Aug '12	Sep '12	Oct '12	Nov '12	Dec '12	Jan '13	Feb '13	Mar '13	Apr '13	May '13
1	Organizational Tasks	110 days	Tue 10/2/12	Mon 3/4/13										
2	Register for the Competition	0 days	Tue 10/2/12	Tue 10/2/12										
3	Gather Funding	1 mon	Tue 10/2/12	Mon 10/29/12										
4	Acquire Core Materials	1 mon	Tue 10/30/12	Mon 11/26/12										
5	Acquire Remaining Materials	1 mon	Mon 12/17/12	Fri 1/11/13										
6	Submit Report	0 days	Mon 3/4/13	Mon 3/4/13										
7	Design Tasks	146 days	Mon 9/24/12	Sun 4/14/13										
8	Conceptual Design	1 mon	Mon 9/24/12	Fri 10/19/12										
9	Preliminary Design	3 mons	Fri 10/19/12	Thu 1/10/13										
10	Build Design	1 mon	Fri 1/11/13	Thu 2/7/13										
11	Test Design	1 mon	Fri 2/8/13	Thu 3/7/13										
12	Rebuild and Retest Design	26 days	Fri 3/8/13	Fri 4/12/13										
13	Compete in SAE Event	0 days	Sun 4/14/13	Sun 4/14/13										

Budget

Competition Expenses

Registration	650
SAE Membership	100
Other	120
	870

Travel Expenses

Lodging and Food	1200
Van Rental	600
Fuel	450
	2250

Building, Misc. Expenses

Raw Materials	1535
Software Licensing	100
Outsourced Components	200
	1835

Grand Total	\$4955
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Why Sponsor Us?

- Self-funded student competition
- Better sponsorship = better design
- Support engineering development through collaborative design
- 100% Tax Deductible
- Organization visibility on team products



VS



Questions?

Backup Slides

Backup Slides: Detailed Budget

<u>Travel Expenses</u>	
Lodging and Food	1200
Van Rental	600
Fuel	450
Summary	2250

<u>Competition Expenses</u>	
Registration	650
T-Shirts	100
SAE Membership	100
Report Printing/Binding	20
Summary	870

<u>Building Supplies</u>	
Outside Contracting	150
Balsa wood	150
Glue	35
Covering	50
Nuts/bolts/screws	30
Glow Plugs	35
Radio/Controller	200
Servos	75
Wheels	50
Aluminum	50
Propellers	50
Engine/Muffler (0)	300
Fuel	100
Flight Simulator	50
Spinners	20
Toolbox Extras	100
Battery	25
Connectors	25
Linkages	25
Modeling tools	50
12V Starter	65
Miscellaneous	200
Summary	1835
<u>Grand Total</u>	4955

Backup Slides: Flight Score

- $FS = RAW + PPB + EWB - TP$
 - RAW = Raw Weight Score
 - $RAW = W * 4$
 - PPB = Prediction Point Bonus
 - $PPB = 20 - (P_{\text{Predicted}} - P_{\text{Actual}})^2$
 - EWB = Empty Weight Bonus
 - 10 points
 - TP = Total Penalty Points

Backup Slides: Mission Constraints

- Aircraft must accomplish a successful takeoff in at least 3 minutes.
- Aircraft must lift from the ground within a take-off distance of 200 ft (61m).
- Aircraft may not be pushed by helper during take-off other than engine run-up
- Aircraft must remain intact during takeoff and landing
- Aircraft must successfully complete one 360 degree circuit of the field
- Aircraft must touch down within the designated landing zone and remain on the runway between the landing limits of 400 ft (122m)
- Aircraft must be controllable in flight

Backup Slides: Aircraft Class Constraints

- No lighter than air or rotary wing aircraft are allowed
- Aircraft shall not exceed a combined length, width and height of 255 inches
- Aircraft may not weight more than sixty-five (65) pounds with payload and fuel
- Aircraft must be identifiable by displaying team number on both the top and bottom of the wing, and on both sides of the vertical stabilizer or other vertical surface in 4 inch numbers
- Aircraft must clearly display the university name on the wings or fuselage.
- Aircraft engine must be unmodified O.S 61FX with E-4010 muffler or the Magnum XLS-61A
- Aircraft engine may not have any muffler extensions or headers
- Aircraft may not have a fuel pump
- Aircraft may make use of gear boxes, drives and shaft as long as a one to one propeller to engine RPM is maintained

Backup Slides: Aircraft Class Constraints

- Fuel tank must be accessible to determine contents during inspections and may be pressurized by a stock fitting on the engine muffler only.
- Aircraft may not have any type of gyroscopic assist
- Aircraft payload must consist of a support assembly and payload plates. All payload carried for score must be carried within the cargo bay. The support assembly must be constructed so as to retain the weights as a homogeneous mass.
- Aircraft payload must be secured to the airframe to ensure the payload will not shift or come loose in flight
- Aircraft design must be capable of loading and securing payload in less than 1 minute
- Aircraft design must be capable of unloading the payload in less than 1 minute
- Aircraft is required to use a 2.5 GHz radio
- Aircraft battery pack may be no less than one thousand mah capacity
- Aircraft must utilize either a spinner or a rounded safety nut

Backup Slides: Material Constraints

- Aircraft may not use metal propellers
- Aircraft may not contain any lead
- Aircraft may not use any Fiber-Reinforced Plastic (FRP) except in the use of a commercially available engine mount and propeller.