



The Wright Stuff

Needs Identification

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Aaron Lostutter

Adam Nelessen

Brandon Perez

Zev Vallance

Jacob Vincent

Agenda

- The “Wright” Team
- Introduction
- Needs Identification
- Problem Statement
- Quality Function Deployment
- Timeline
- Summary



The “Wright” Team

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



Introduction

- **Customer**
 - Society of Automotive Engineers (SAE)
- **Project**
 - AeroDesign West Competition
 - Self-motivated, self-funded project
 - Test of individual and group capabilities

Needs Identification

Current remote-controlled aircraft do not
carry sufficient payload

Problem Statement

- **Goal:**
 - Design and manufacture a model aircraft to carry at least 25 lb of payload
- **Objectives:**
 - Implement engineering design process



Objectives

Objective	Basis for Measurement	Units
Sponsorship/Cost	Money	\$
Maximum Payload	Weight	lb
Minimal Weight of Aircraft	Weight	lb
Aircraft Maneuverability	Turning radius	ft
Aircraft Take Off	Distance	ft
Aircraft Landing	Distance	ft
Safety/ Controllability	Injuries	
Stability	Center of gravity	ft
Crash Durability	Broken parts	
Payload Assembly	Volume/time to assemble	ft ³ /s
Payload Prediction	Lift	lb
Propulsion	Thrust	lb

Design Constraints

- **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)



Test Environment

- Location: Phoenix, AZ
- Most comparable environmental conditions to competition location
 - Elevation
 - Air density
 - Wind speeds

Quality Function Deployment

		Engineering Requirements						
		Yield Strength of Components	Location of Center of Gravity	Lift and Drag	Thrust	Aircraft Weight	Turning Radius	Cost
Customer Requirements	Carries Load	x		x	x	x		
	Maneuvers Through the Course			x			x	
	Takes Off from Runway	x		x	x			
	Lands on Runway	x		x				
	Safe, Stable, and Controllable	x	x	x	x		x	
	Predictable Payload	x	x	x				
	Crash Durability	x						
	Inexpensive	x					x	x
	Units	psi	ft	lb	lb	lb	ft	\$

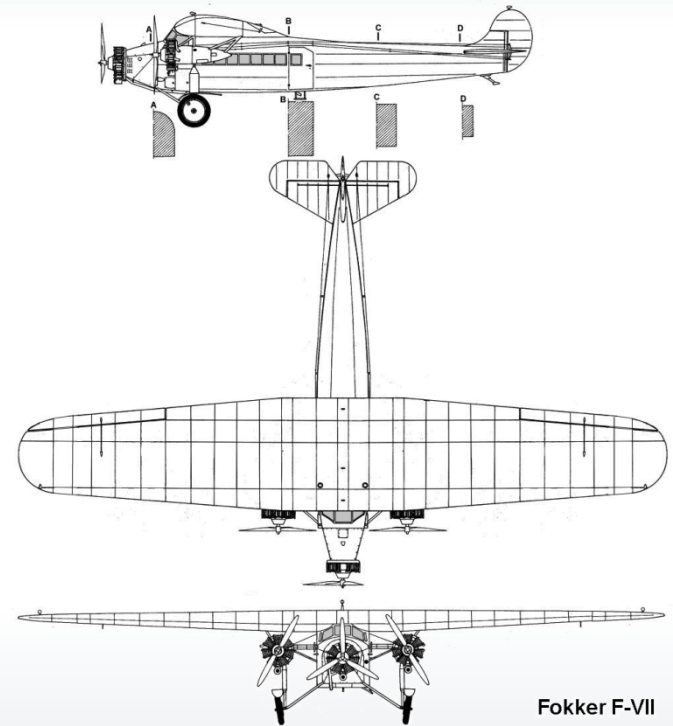
House of Quality

After Heavy Winds



Summary

- “The Wright Stuff”
- SAE Aero Design Competition
- Engineering design process
- WIN!



References

- SAE International 2013 Collegiate Design Series: Aero Design[®] East and West Rules

Questions?