

### College of Engineering Department of Mechanical & Industrial Engineering





### Objective

To designed and built an aircraft that can carry 35 passengers and 17.5 lbs. of luggage while observing a maximum power constraint to compete in the SAE Aero West Competition.

Final Flight Score (FFS) = 
$$\frac{1}{40N}$$

$$\frac{1}{40N} \left| \sum_{1}^{N} \right|$$

100P + 50C - 100E

- N = Total number of flight rounds during competition
- *P* = Number of seated passengers carried on a flight
- C = Luggage weight [lb]
- E = Number of empty seats

### **Engineering Specifications**

Component	Specification	Result
Wingspan	< 144 in	143.5 in
Gross Aircraft Weight	< 55 lb	30 lb
Empty Weight	15 lb	18 lb
Passengers	35	20
Luggage	17.5 lb	10 lb
Motor Power Limit	1000 W	_

### Electronics



Concept Generation Sep 13 – Sep 24

Concept Selection Sep 24 – Oct 8

Sponsors: LaSPACE, Mr. Jack Rettig, ExxonMobil, Halliburton, Dr. Keith Gonthier



College of Engineering School of Electrical Engineering & Computer Science



# **SAE Aero Design Regular Class**

Nour Amous, Paskah Deo Gratias, Alex Dixon, Joshua de Boisblanc, Charles Hamilton, James Szeszycki



Ana	Analysis	
Component	Result	
Ground Run Analysis	160 ft	
Airfoil Determination	CH 10-48-13	
Takeoff Velocity	24.2 $\frac{ft}{s}$	
Rate of Climb	$2.9 \frac{ft}{s}$	
Wing Area Determination	20.9 <i>ft</i> <sup>2</sup>	
Static Thrust	11.3 lb	



# **To Predict > To Design > To Perform**

# ME, ECE Capstone Design Programs

HALLIBURTON





- Proper PPE
- Red arming plug
- Motor safety nut
- Propeller awareness
- Lipo-safe charging bags
- Fail-Safe System

	Manufactur	ing
Component	Material	Process
Wings and Tail	EPS Foam, Balsa Sheet	Hot wire shaping and wrapped in Balsa
Fuselage	Balsa Wood, Spruce	Laser cut, glued with CA and Epoxy
Landing Gear	3/16" thick Aluminum 6061 plate	Cut a strip for each leg bent, attached axils. Nose is commercially available product.

	Testing
Component	Objective
Motor/Propeller	Static and dynamic thrust testing
Fuselage	Drop test
Wings	Wing bending
Landing Gear	Drop test
Flight	Takeoff distance, stability, controllable landing

Results			
Component	Score	Rank	
Report	35.4388	15th	
Presentation	42.4167	6th	
Flight	0	13th	

29<sup>th</sup> Overall of 37

Manufacturing Dec 12 – Mar 15

Testing Jan 1 – Mar 20

Competition April 5 – April 7

Advisors: Mr. Jack Hawkins, Dr. Shyam Menon, Dr. Genevieve Palardy

