

DESIGN REVIEW 1



# SAE Aero Team

Team 508:

David Jay Michael Nalovic Sofia Rodriguez Tristan Wahl

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# Meet Team 508



David Jay  
*Manufacturing  
Engineer*



Michael Nalovic  
*Controls  
Engineer*



Sofia Rodriguez  
*Aeronautics  
Engineer*



Tristan Wahl  
*Flight Design  
Engineer*

Michael Nalovic

# Sponsor and Advisor



Florida Space Grant  
Consortium



Dr. Yousuf Ali  
*Teaching Faculty II*

Michael Nalovic

# Project Objective

## SAE Aero Design

- Design and manufacture a 3D printed remote control airplane within the rules of the SAE Aero Design Competition - Regular Class
- Designed to present real world challenges involved in the creation of an aircraft



Michael Nalovic

# FAMU-FSU Aeronautics Approach

## Aeronautics

- Subsection of the SAE Aero Team.
- Differs from Fuselage team in that the primary focus is airfoil design and control surface integration.
- Research and application of physics based aeronautical principles to ensure a stable and successful flight.



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# Project Objective

## Creation

To design, fabricate and test a radio-controlled aircraft that can carry a specified payload.

## Innovation

To center conceptualization around successful implementation of cutting-edge engineering techniques

- 3D printed lightweight PLA
- Advanced forms of structural securitization

## Participation

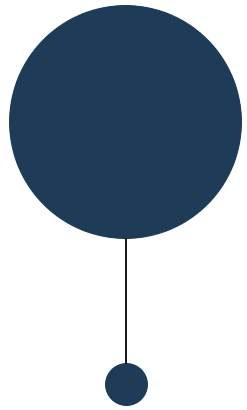
To ensure that all competition guidelines are met in order to successfully compete.

Including but not limited to:

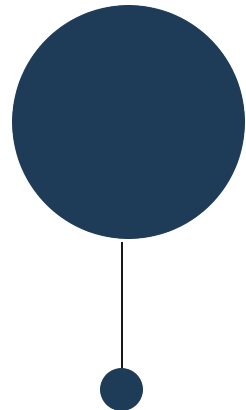
- Weight
- Wingspan limit
- Material restrictions

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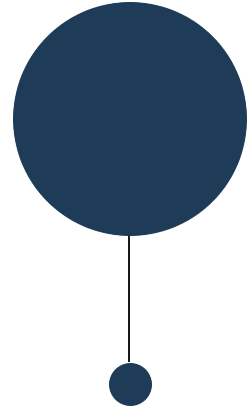
# Key Goals



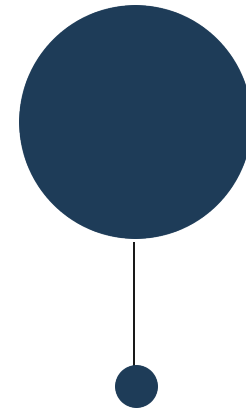
Securely hold the  
payload  
designated by SAE



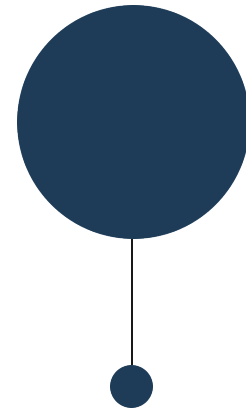
Coordinate and  
Communicate  
with the Fuselage  
Team



Design and  
Create  
Control Systems



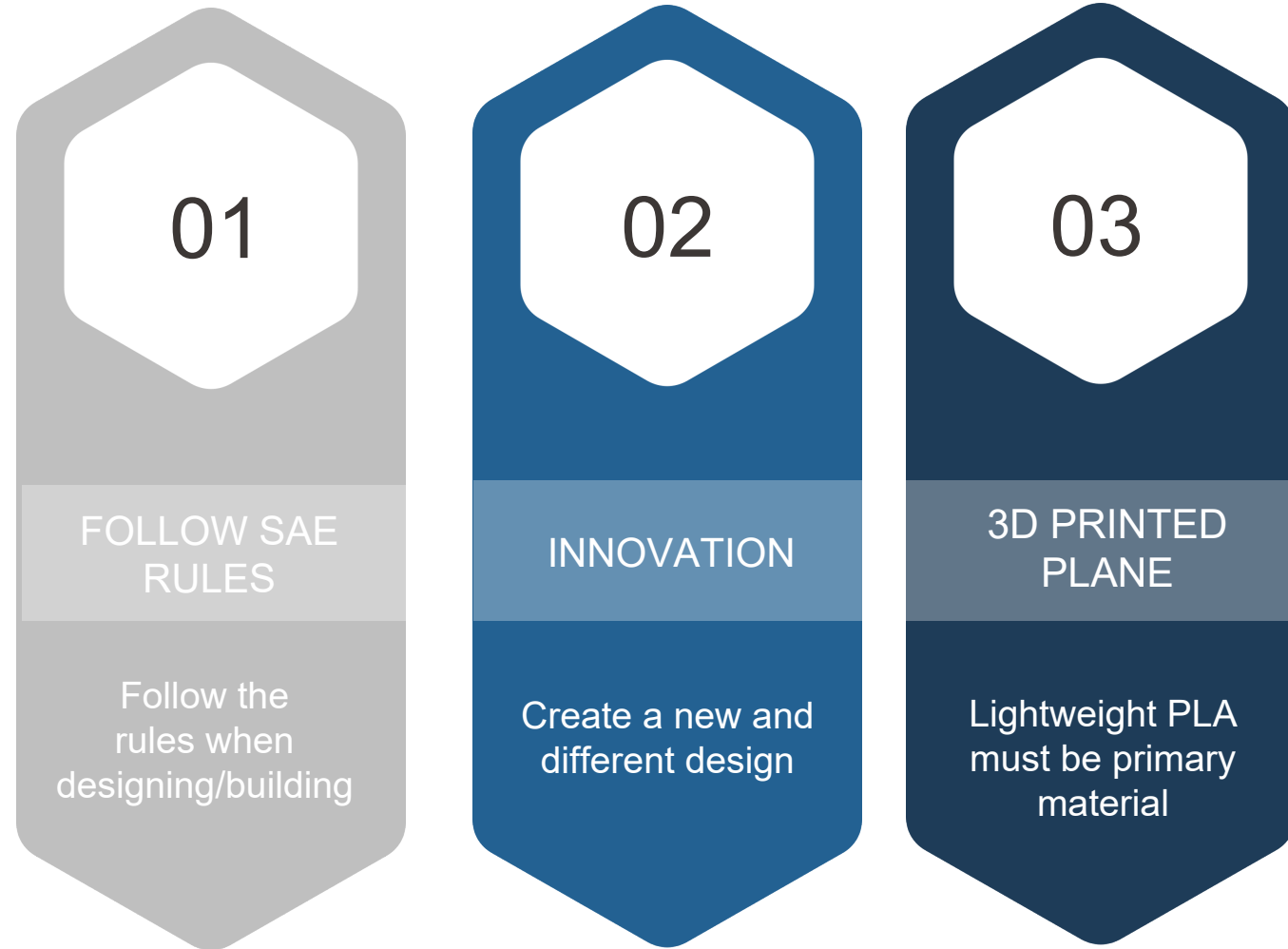
Design Plane  
using Innovation



Testing through  
Aerodynamic  
Validation



# Customer Needs



Sofia Rodriguez

# Past Competitions



Figure 1: 2018-2019 Competition



Figure 2: 2020-2021 Competition

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# 2019-2020 Competition

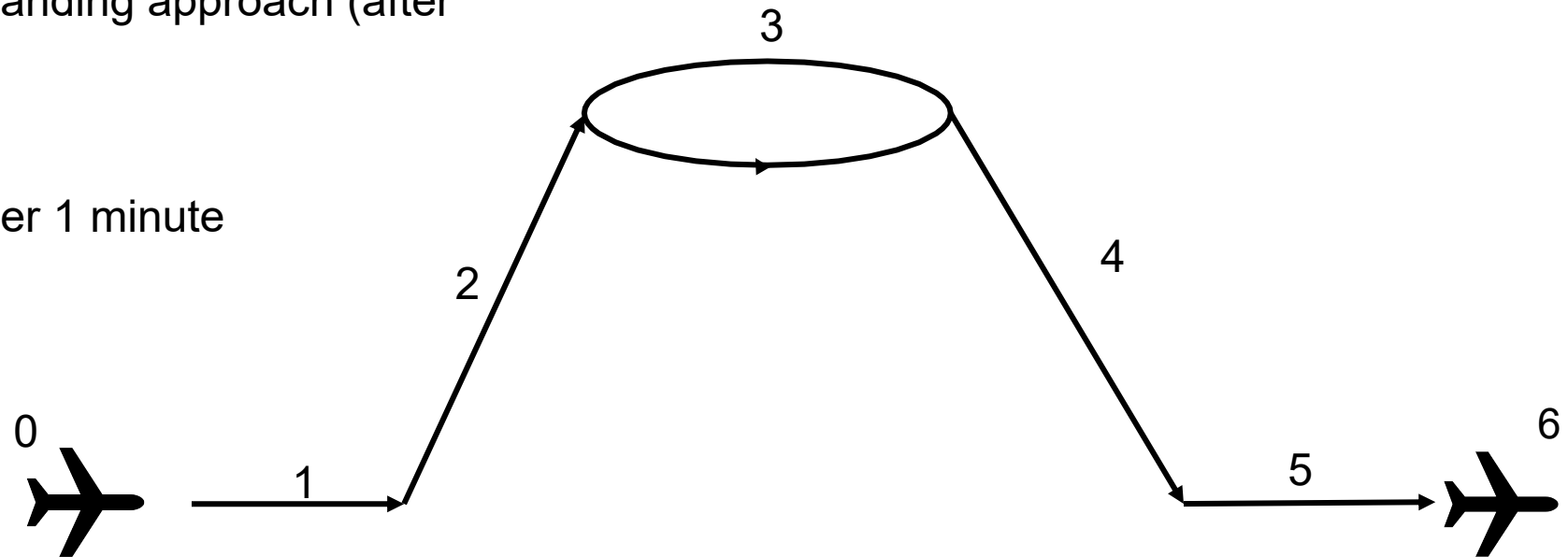


Figure 3: 2019-2020 Competition

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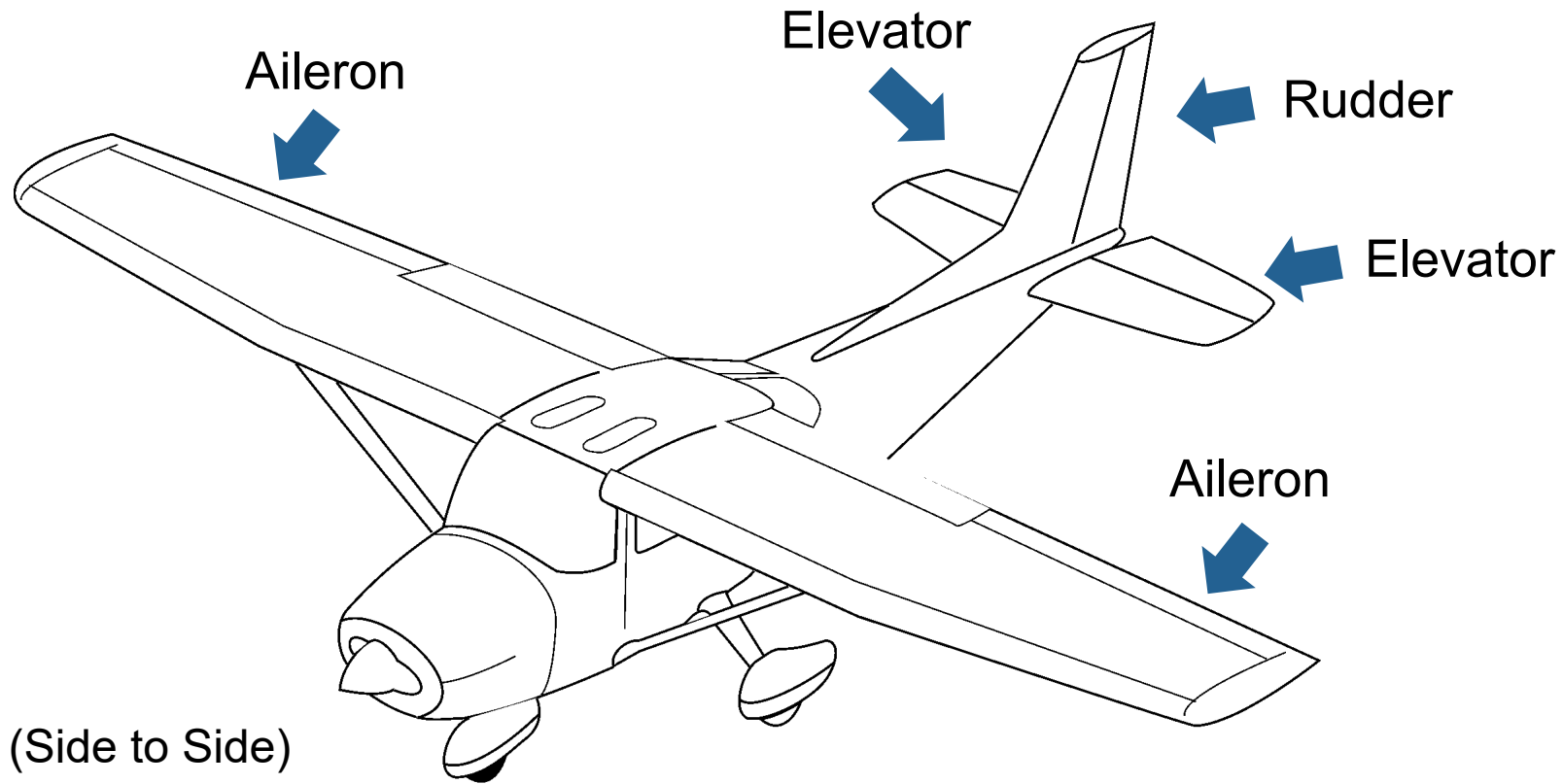
# Mission Profile

0. Mission begins with payload on board
1. Takeoff in less than 100ft
2. Climb to safe altitude
3. Loop back around for landing approach (after 400ft)
4. Landing approach
5. Land on same runway
6. Unload payload in under 1 minute



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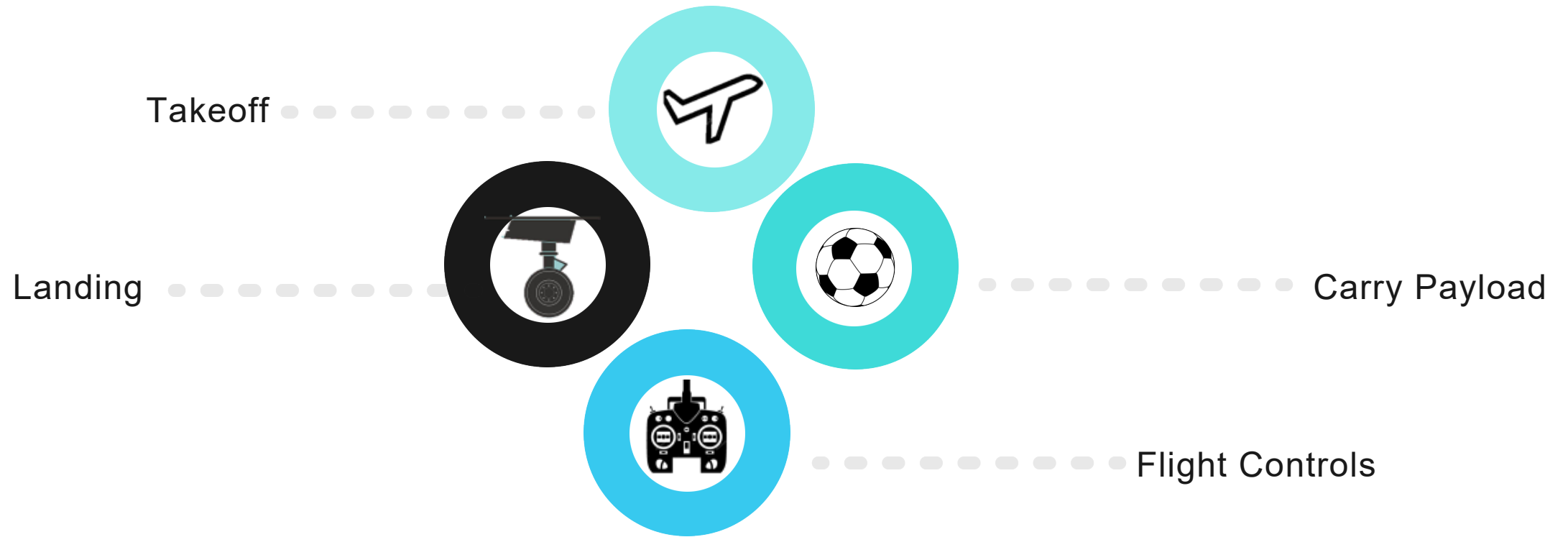
# Plane Control Surfaces



Rudder: Change Yaw (Side to Side)  
Elevator: Change Pitch (Up and Down)  
Aileron: Change Roll

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# Major Functions



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# Major Functions



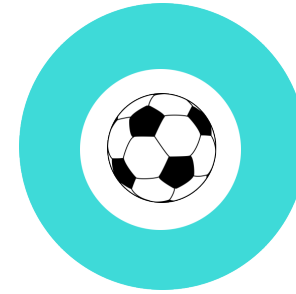
Move Down Runway  
Overcome Drag



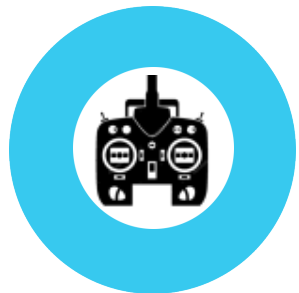
Accelerate  
Enable Lift



Absorb Shock



Load and  
Unload  
Payload



Flight Controls (Yaw, Pitch, and Roll)

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# Prototypes

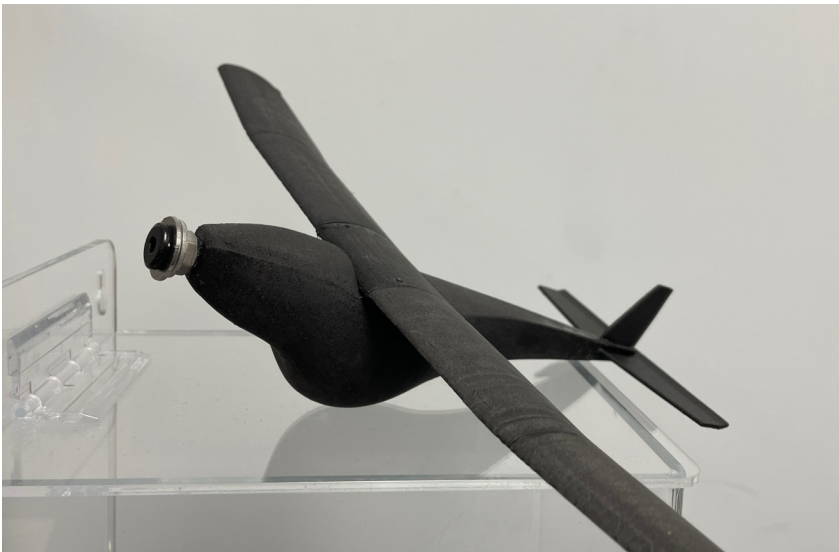


Figure 4: Prototype "Guppy"



Figure 5: Prototype "Dolphin"



Figure 6: Prototype "Dolphin 2.0"

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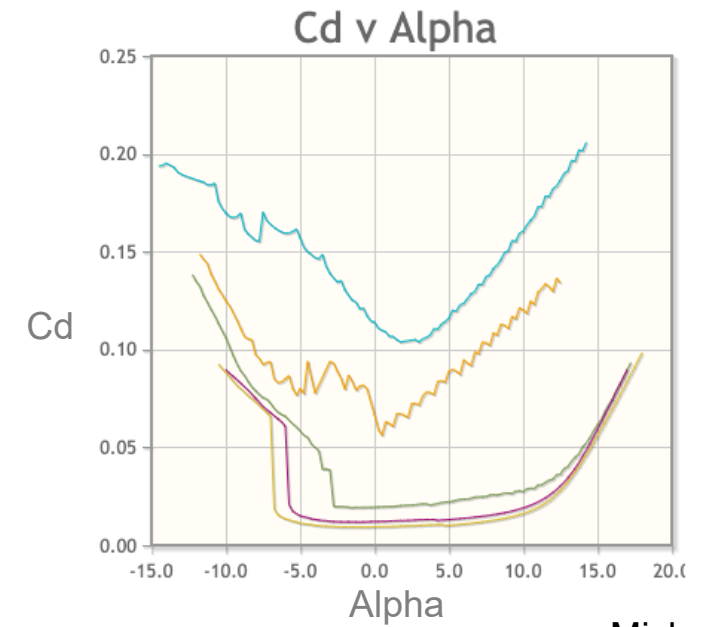
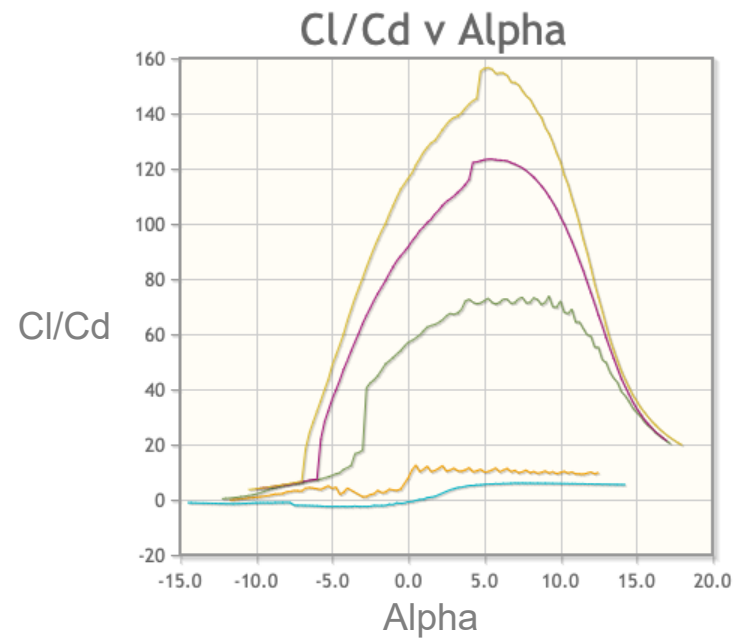
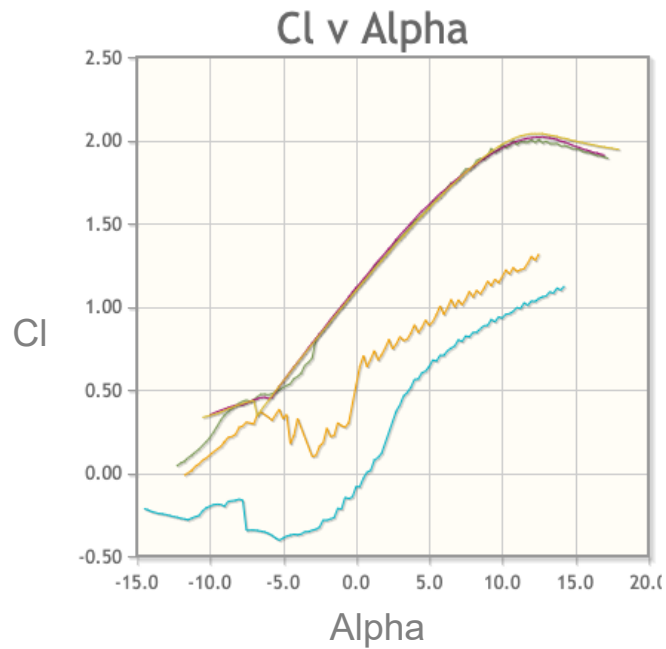
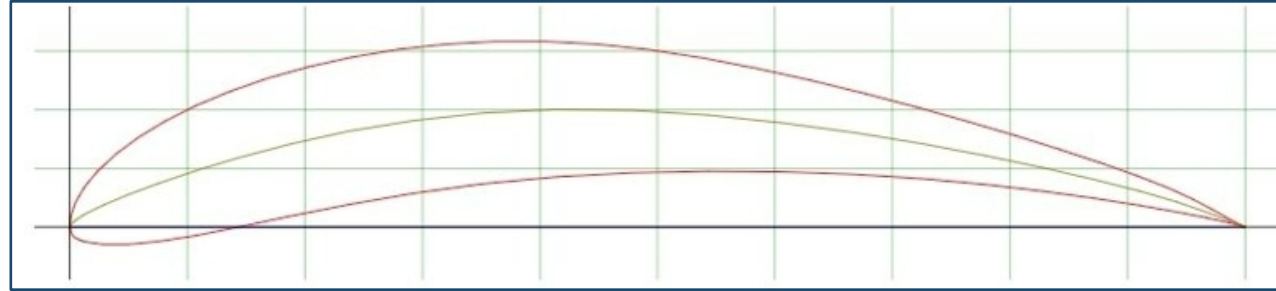
# Cirrus SR22



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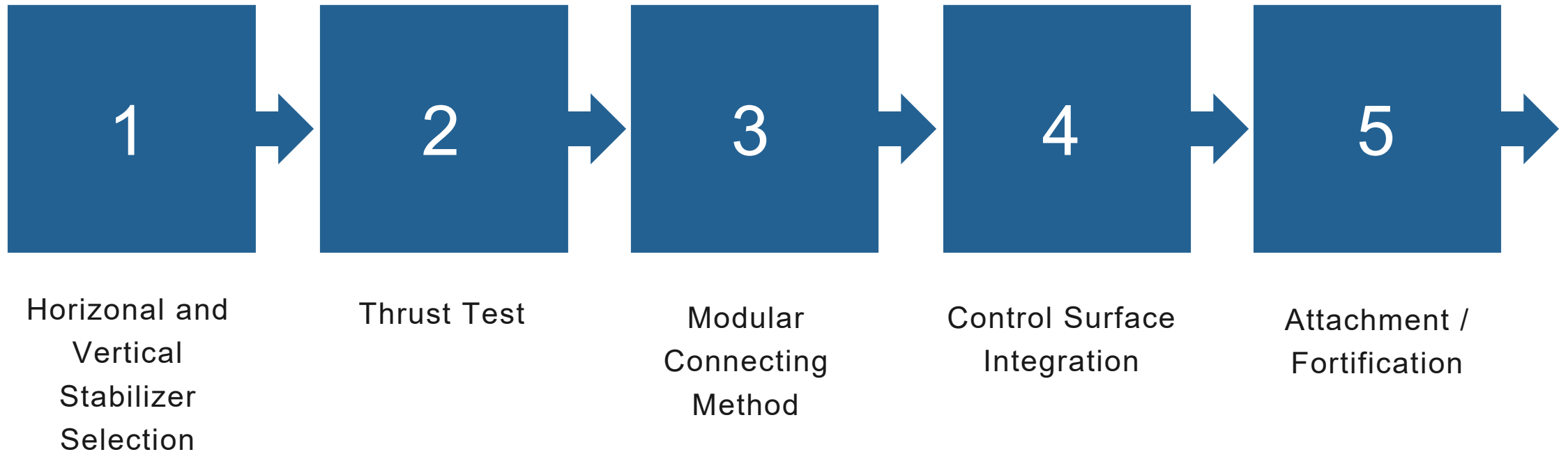
# Eppler E423

Airfoil Design



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# Future Work



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# Future Work

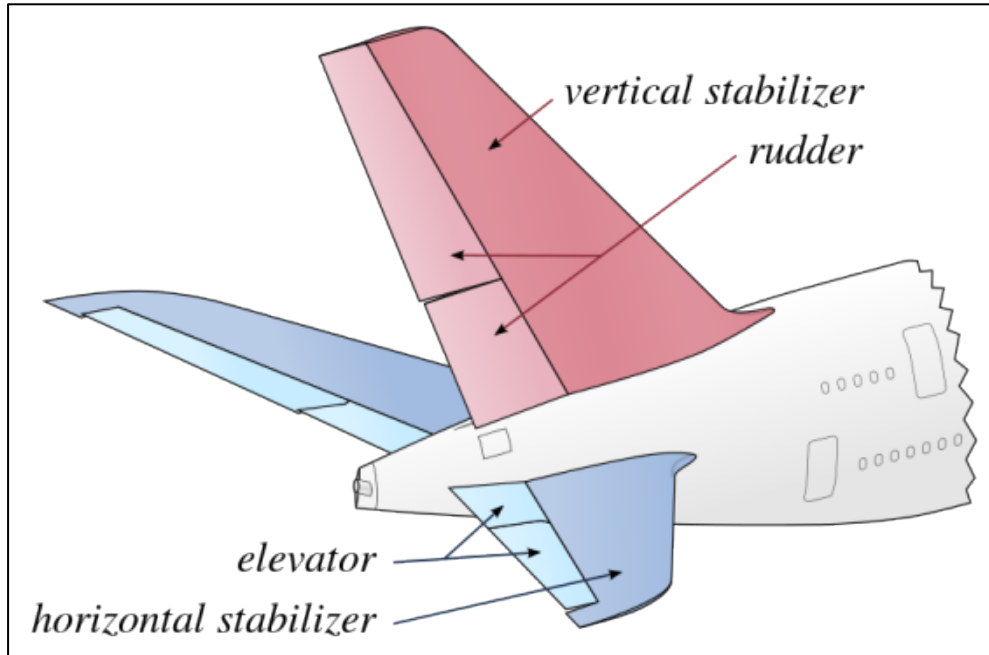


Figure 7: Empennage with Control Surfaces

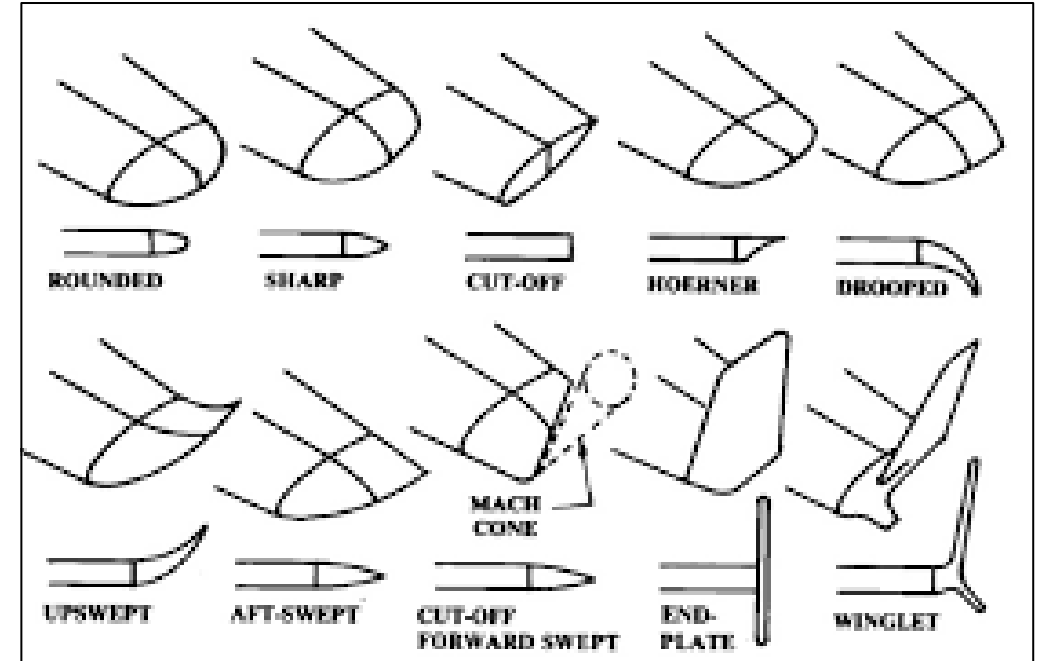


Figure 8: Various Winglet and Wingtip Designs

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# References

- Dr. McConomy, S. (2021). Customer Needs.

“2022 SAE Aero Design Rules.” *SAE Aero Design*,  
[www.saeaerodesign.com/cdsweb/gen/DocumentResources.aspx](http://www.saeaerodesign.com/cdsweb/gen/DocumentResources.aspx).

<http://airfoiltools.com/airfoil/details?airfoil=e423-il>

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