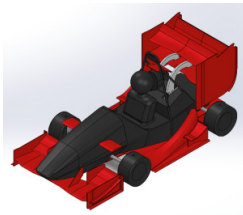


AEROSPACE ENGINEERING

AER Wind Tunnel Study



AER WIND TUNNEL STUDY

We validated current AER CFD and providing them with pressure distribution through experimental methods. We then created our own aerodynamics package (front wing / rear wing) to directly compare using lessons learned through design philosophy and experimental testing of AER-26. The main goal of this study is to provide AER with valuable information about their race vehicle’s aerodynamics design to be compared to the results obtained during live testing trials. The main learning objective is race car aerodynamics design and using CFD.

MEMBERS

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 Anthony Pena Barerra
 Riku Okubo

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Aleborne



2025-2026 NEXT GENERATION CARRIER-BASED STRIKE FIGHTER CONCEPT

7-person team designing a next-generation carrier-based strike fighter concept responding to the 2025–2026 Navy RFP for AIAA Competition. It is meant to achieve a 700 nmi combat radius with internal weapons carriage for survivability, TRL 6+ subsystems, and 25-year maritime durability, with other constraints. Validated CVN-68/CVN-78 compatibility (catapult launch, arrested recovery, deck/hangar limits) and sized air-to-air and precision-strike payloads while iterating on remaining dash/turn performance targets.

MEMBERS

Maxwell O’Neill
 Ethan Barichievich
 Luke Horton
 Benjamin Torres
 Ian Plant

ADVISORS

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 William Peterson
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ANCS



FIN-CONTROLLED, WAYPOINT-GUIDED ROCKET

The objective of this project is to design, build, and launch a fin-controlled rocket to guide itself autonomously towards a weather balloon. The entire project has been built from scratch; custom PCB and electronics, custom code and flight control software, and custom body and moving parts. We’ve successfully built, simulated, and launched the rocket shown many times.

MEMBERS

Jeffery Schroeder
 Jared Maestri
 Logan Smith
 Clement Colwell

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 Tlalli Urbano
 SDSU
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Andromeda SpaceWorks



HIGH-POWERED SOLAR ELECTRICALLY PROPELLED (HPSEP) SPACE TUG

The High-Powered Solar Electric Propulsion (HPSEP) space tug is a reusable cislunar transport vehicle designed to move cargo between Earth and lunar orbit using high-efficiency Hall thrusters, roll-out solar arrays, and on-orbit refueling. To represent one of its critical subsystems, we built a reaction-wheel prototype that demonstrates how the tug maintains precise attitude during long-duration thrusting, docking, and solar-array tracking. Our prototype showcases the ADCS principles that keep the full-scale HPSEP tug stable and mission-ready.

MEMBERS

Majied Alfar Diaz
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Kiersten Funk

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Bang-Bang Baddies



BANG-BANG PRESSURE REGULATION SYSTEM

The Bang-Bang Baddies are tasked with designing a bang-bang pressure regulation system for SDSU Rocket Project. To maintain a stable engine burn, the pressure in the propellant tanks must be held constant by regulating the flow of nitrogen from the pressurant tank. Our team is building out a system, that uses three electrically actuated solenoid valves to regulate a constant outlet pressure. By opening and closing in response to pressure changes, the valves will maintain tank pressure within a 10 psi band throughout operations.

MEMBERS

Alex Aarhus
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Samuel Carmon
Annie Coker
Arabella Kriedeman

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Barrelborne



WING IN GROUND EFFECT RC PLANE

OverrideX's WIG RC prototype is a Boeing Pelican inspired wing in ground effect aircraft designed to exploit the lift and efficiency gains that occur when flying just above water, where wingtip vortices and downwash are reduced and induced drag drops. The vehicle can achieve longer endurance and higher payload efficiency than a conventional RC aircraft at the same power. The program integrates retractable footpods to get the aircraft at the appropriate ride height.

MEMBERS

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Condor Drones



EFFICIENT MEDICAL DELIVERY DRONE

A blended wing drone engineered to maximize range and speed, enabling rapid medical delivery to remote and rural communities. Its low-drag aerodynamic design supports longer missions and lower production cost when compared to traditional aircraft designs. Our product will yield reliable access to medical supplies transport where infrastructure is limited or emergencies demand rapid response.

MEMBERS

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 Mohammed Haneef
 Mujib Sarwari
 Talal Aldulimi

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CryoLuna



CRYOLUNA, LUNAR ICE DETECTION SATELLITE

CryoLuna is a lunar satellite whose mission objective is to analyze the lunar poles to determine the quantity of ice beneath the lunar surface. These ice deposits are crucial for future lunar missions as the lunar ice can provide hydrogen and oxygen for life support systems for manned missions. This hydrogen and oxygen can also be repurposed into rocket fuel for missions into deep space.

MEMBERS

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 Mason Crook
 Sam Eckenburg
 Alan Figueroa
 Blake Huckaby

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 Shezreen Khan
 Jacob Ogle
 Halina Victoria Santos

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Delta Divas



DIVANET MARS COMMUNICATION NETWORK

Future large scale exploration of Mars is limited by a lack of existing communications infrastructure. This project develops a near-term solution to this issue through a 12-satellite constellation providing surface to surface and surface to Earth capabilities for the entirety of Mars. Using a novel inclination-changing aerocapture maneuver to save fuel and provide greater surface communications coverage, this constellation was designed to launch on a single Falcon Heavy rocket.

MEMBERS

Alex Aarhus
 Joseph Arzillo
 Raquel Berk
 Sam Carmon
 Annie Coker

Laasya Gangavarapu
 Bella Krideman
 Kendall Shaw
 Parth Solanki

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Destiny



DESTINY

Our senior design project develops a conceptual mission architecture to utilize the Solar Gravitational Lens (SGL) for high-resolution imaging of a potentially habitable exoplanet. The spacecraft employs advanced propulsion and thermal protection strategies to travel beyond 550 AU, where the Sun's gravity acts as a natural telescope. The design integrates propulsion, thermal control, structural, communications, and payload subsystems to evaluate feasibility, performance margins, and mission scalability.

MEMBERS

Wyatt Welch
Jayden Thomas
Arian Mazdeh
Nicklous Ngo
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Parham Khodadi
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Elite Ball Knowledge



BASEBALL AVOIDANCE MULTIROTOR (BAM)

Open-source NASA Langley Research Center challenge project, with the aim to demonstrate the ability for a quad-rotor to autonomously avoid baseballs on collision courses (in real time). The project is simulation-based using the Monte Carlo method, MATLAB/Simulink, C++, Python, Unreal Engine 5, and other robotics and simulation software. The final program is ready-to-port to off-the-shelf quad-rotor drones.

MEMBERS

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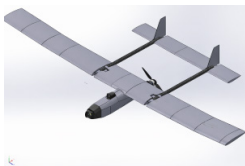
ADVISORS

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Ember Eye



HYBRID-MANUFACTURED FIXED-WING UAV FOR COASTAL / FIRE SEARCH AND RESCUE

Ember Eye is a light-weight, long-endurance fixed-wing UAV for search and rescue and wildfire detection. It comes equipped with a thermal imaging camera that detects the heat signatures of missing persons and hotspots of emerging wildfires in coastal and wilderness areas. Constructed from a carbon fiber internal frame and 3D-printed parts, Ember Eye is an affordable, easy-to-assemble UAV suitable for first responders.

MEMBERS

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Ethereal



NEXT GENERATION CARRIER-BASED STRIKE FIGHTER AIRCRAFT

This project proposes a next-generation, carrier-based strike fighter optimized for a 2035 Initial Operational Capability TRL greater than 6, and in production components. Utilizing a canard configuration to achieve superior low-speed handling and reduced stall velocities, the design ensures rigorous carrier suitability for CVN-68/78 operations. An all-internal weapons bay minimizes radar cross-section during high-stakes missions, including 700nm radius air-to-air combat and sea-level strike sorties. The platform delivers high-performance lethality while breaking historical cost-growth trends.

MEMBERS

Logan Smith
Mika Nash
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Iris Kashirsky

Julio Bravo
Saya Kimura

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Firewall



PORTABLE WIND SHAPER

The goal is to design and manufacture a 3x3 ft portable wind shaper that is fitted with fans, able to generate various wind speeds for open-air testing. With hopes to be able to construct a realistic testing environment for research in aerial firefighting and drop dispersion effects in intense wind conditions.

MEMBERS

Sam Eckenburg
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Laika Aerospace



EUROPA LANDER MISSION

The Europa Lander Mission is a conceptual aerospace systems design focused on delivering a stationary scientific lander to the surface of Jupiter's moon Europa. The project addresses extreme radiation, low solar flux, and cryogenic thermal conditions through integrated power, thermal, communications, structures, and avionics subsystems. As part of the project, the team will design and present a representative mission subsystem or scaled prototype to demonstrate key engineering trades and system level performance.

MEMBERS

Brennan Klatt Fogleman
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Kyle Loutzenhiser
Clement Colwell
Dustin Cruse

Wyatt Charrette
Joshua Laurain
Dario Bautista
Anthony Cortes

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PIV Patrol



VISUAL ANEMOMETRY

Visual Anemometry infers flow speed and direction from visual motion of structures and flow-structure interaction physics. This project seeks to find the boundary conditions of visual anemometry as a tool and demonstrate it in water to assess how different fluid properties influence motion-flow relationships relative to air.

MEMBERS

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Project Gridlock V2



PROJECT GRIDLOCK V2

Gridlock V2 continues the original Project GridLock research by building on the unihex grid fin geometry identified as the strongest performer. The original project examined various grid fin geometries to identify relationships between geometric parameters and grid fin performance. This project focuses on refining that proven baseline through targeted modifications such as chamfers and serrations, rather than introducing entirely new grid patterns. All variants will be 3D printed and tested in the SDSU subsonic wind tunnel across multiple freestream speeds and angles of attack to compare lift, drag, moment, and overall efficiency.

MEMBERS

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SDSU Smoke Rake



SDSU SMOKE RAKE

We built a smoke visualization system to replace the current method inside the SDSU low speed wind tunnel lab. The project includes a controlled smoke generator, a transverse motion rig, and a smoke rake. This improves upon the current method in use by having the smoke generation be in a closed tunnel setting and able to project smoke on every part of the model without stopping the tunnel and adjusting.

MEMBERS

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Sleipnir



SLEIPNIR - CONCEPTUAL SUPERSONIC BUSINESS JET DESIGN

Sleipnir is a conceptual supersonic business jet designed to transport up to 10 passengers at speeds of Mach 2. The proposed aircraft has a maximum takeoff weight of 130,000 pounds and features a delta wing configuration with twin engines. This project aims to optimize aerodynamic performance, propulsion integration, and overall efficiency to support the reintroduction of supersonic business travel into the commercial aviation market.

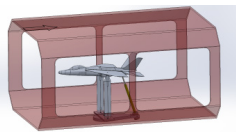
MEMBERS

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Vertical and Horizontal Tail Design for Fighter Aircraft



VERTICAL STABILIZER DESIGN FOR FIGHTER AIRCRAFT

Wind Tunnel and CFD data analysis of six different tail configurations for a fighter style aircraft to reduce size, while maintaining pitch and yaw stability. A 3-D model was created as a reference body, and then six different tails were created to be quickly removed and replaced for systematic testing. The traditional, single vertical stabilizer and horizontal stabilizer tail design was created as the baseline to show the changes in pitching and yawing moments with the five other tail models.

MEMBERS

Rogelio Estrella
Hector Granados
Cristian Hernandez
David Martinez

Joey Renfrew
Madison Tea

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VTOL UAV



VTOL UAV

The objective of this project is to design a VTOL UAV. The aircraft performs vertical takeoff and landing while achieving efficient forward flight. The goal was to develop a feasible VTOL configuration that meets mission requirements for range and overall endurance, with a primary emphasis on optimizing the transition from vertical takeoff/hover to level flight, where significant energy losses occur, while balancing performance, mass, and system complexity.

MEMBERS

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