AEROSPACE ENGINEERING

Aerospace Homeland Defense

MEMBERS

Hanna Fakhouri
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Dylan Ramsay
Mitchell Surrey
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ADVISORS

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THE HOMELANDER INTERCEPTOR

A high-performance, low weight, and cost-effective Homeland Defense Interceptor (HDI) that fulfills defense missions of different profiles provided by the AIAA undergraduate team design competition. With a cap of $25 million per unit, the aircraft will perform various roles including intercepting threats and escorting missions.

ARCS - Amateur Rocketry Control System

MEMBERS

Sebastian Gonzalez
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Kyle Huynh
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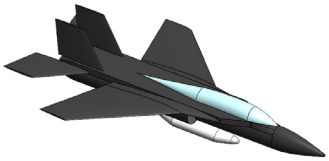
ARCS - AMATEUR ROCKETRY CONTROL SYSTEM

Develop and demonstrate a low-cost, lightweight, and reliable Reaction Control System (RCS) prototype for amateur rocketry teams. By leveraging COTS hardware and minimal custom components, the system will integrate fluid, structural, avionics, and control subsystems to achieve effective attitude control. We aim to significantly lower the barrier for advanced rocket stabilization and maneuverability in the amateur rocketry community

Arthropod Aeronautics



MEMBERS

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ANOMALOCARIS

Advanced pilot trainer(ATP. Jet trainer, designed to replace the T-7 Talon to help train future pilots using a more efficient and better performing aircraft. Anomalocaris will be within the same price range of the T-7, while providing better overall performance for pilots to fly in and train. While adhering to the general guidelines provided by the system requirement documents for an ATP, Anomalocaris was designed with the intent to include configurations to help induce real life scenarios to help train pilots for the potential environments that they would fly in.

C.A.S.P.E.R Lunar Mission

MEMBERS

Jose Reyes
Sebastian Gonzalez
Kyle Enriquez
Ruby Cave
Sean Brucker
Alec Delgado
CJ Flores
Noah Noxon

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C.A.S - PI ROVER

The project designs a lunar mission using a rover to collect and store lunar ice to further deep space exploration. A rover prototype will also be built to accomplish demonstrative lunar objective missions. The rover will display maneuverability around and over obstacles, will be remotely controlled and navigated using a camera, and display drilling and storage mechanisms to collect sample data.

Eosphorus

MEMBERS

Alexander Ngo
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Jarret Hartwig
Diego Perea
Aidan Anuskiewicz
Logan Resendez
Alessandro Cauvi
Aldo Lopez

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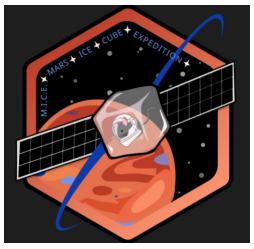
EOSPHORUS MISSION

The goal of the project is to design a mission to send an orbiter (Eosphorus) and surface probe (Atropos) to Venus. The orbiter will improve the gravitational model of Venus and map the lower-level atmospheric temperature distribution. The probe will detect and measure surface-level phosphine concentration, and determine the chemical composition of the soil. A prototype will demonstrate key technologies of the probe such as attitude control, communications, and sampling of the atmosphere during descent.

SDSU
San Diego State University

MICE



MEMBERS

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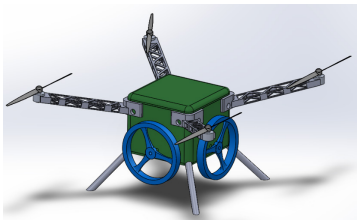
MARS ICE CUBESAT EXPEDITION

Mars Ice CubeSat Expedition has the goal to develop a scalable approach to planetary mapping using SmallSat technology to obtain high-resolution data without needing large expensive hardware. Two main objectives are to map near-surface ice deposits in mid-latitude regions of Mars, and to validate aerobraking technologies using SmallSats.

Project G-7



MEMBERS

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HOVER STABILITY DRONE

By using reaction wheels, a drone can correct deviations in pitch and roll so it can maintain a stable orientation with low reliance on aerodynamic forces or motor thrust adjustments. This method could create better stability, reduce noise, and provide improved attitude control in various conditions.

Project Gridlock

MEMBERS

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INVESTIGATION ON GRID FIN GEOMETRY AND ITS AERODYNAMIC EFFECTS IN SUBSONIC FLOW

Our project focuses on investigating and optimizing the aerodynamic performance of grid fins by comparing two previously studied geometries to our own custom grid fin geometry. Previous studies and their findings informed our design for our grid fin. All grid fins were tested in the subsonic wind tunnel with data collected by the force-balance system and the flow was visualized with smoke.

Project Zeus

MEMBERS

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Faerich Nieva
Jacob Warren
Mercedes Flores
Moises Ortiz-Flores
Njata Holland
Tyler Lui

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ADVANCED PILOT TRAINER

Our team has been tasked with designing a next-generation advanced pilot trainer to succeed the T-38C, the current training aircraft used in the U.S. Air Force's Specialized Undergraduate Pilot Training (SUPT) program. This land-based aircraft will train pilots in the fighter and bomber track and Introduction to Fighter Fundamentals (IFF), equipping them with the skills needed to transition into modern combat aircraft while meeting U.S. Air Force (USAF) operational requirements.

ReconRoost

MEMBERS

Joshua Baker
Anthony Cortes

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BATTERY SWAPPING SECURITY DRONE

Our drone aims to provide a more efficient and thorough alternative to conventional security cameras. The drone will be able to cover blind spots and keep constant surveillance of a perimeter. The flight time will be optimized due to our ability to autonomously swap out the drones battery at its landing station. We will also design a lightweight structure to conserve battery for when it is patrolling.

Seal Team 6

MEMBERS

Luca Capperucci
Sean Hodgson
Yaseen Abdullah
Abdulaziz Alqubayli
Ahmed Mohamed
Jackson Green
Emilio Spadaro

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T-16 SEAL

The T-16 Seal is a versatile advanced pilot trainer aircraft designed for training pilots on modern fighters. It features innovative design elements for improved maneuverability, control, and efficiency. With reliable engines, low maintenance costs, and the ability to handle both short and long-range missions, the T-16 is a competitive option for advanced pilot training.

Team Tezca Talon

MEMBERS

Remi I. Chappelle
Darin A. Jackson
Andrew J. Lovejoy
Peter Y. Nyden
Dalhia A. Ruiz-Fernandez
Adrian R Saldaña
Thomas D. F. Smith

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TEZCA TALON

The AIAA Homeland Defense Interceptor competition tasks students with designing an unmanned, all-weather fighter for counter air patrol and interception missions. The Tezca Talon is optimized for supersonic interception and operates from any NATO-standard airfield. This project assesses its design, mass properties, aerodynamics, propulsion, performance, stability, control, and life cycle costs.

The Falconers

MEMBERS

Ahmed Mohamed
Yaseen Abdullah
Abdulaziz Alqubayli
Max Arthur

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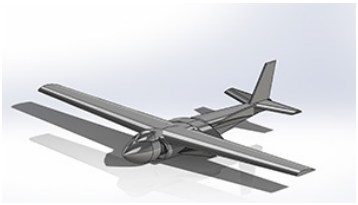
HIGH-SPEED CAMERA DRONE FOR MOTORSPORT FILMING

As motorsports have evolved with faster technology, traditional camera systems have struggled to match the agility and speed required to keep up with motorsports while delivering immersive aerial photography. The use of camera drones in sports massively enhanced the viewing experience by having the camera drone follow the racers closely through every turn, making it seem that the view is right behind the driver.

The High Ground



MEMBERS

Briana Martinez
Ryan Reno
Jack Hallonquist
Joshua Baker
Lance Baldemeca
Joel Sampol

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INNOVATIVE CLOSE AIR SUPPORT

The design of a more efficient, cost effective and newly designed close air support aircraft with the support of Geoffrey Butler. We will be using classic and new ideas implemented from the A10 F15 and Harrier Jet. We will be showcasing our design with models and explaining its innovation to previous close air support aircraft.

The Tlaloc

MEMBERS

Ryan Harrison
Bryan Ramirez
Jenna Schrady
Andrew Lovejoy

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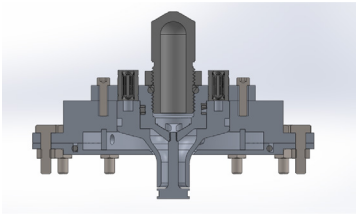
THE TLALOC - NATURAL DISASTER RELIEF DRONE

The Tlaloc is a versatile, affordable solution for addressing deficiencies in disaster relief efforts. It is designed for critical moments after a disaster, where existing teams may lack the necessary equipment. With a one-time manufacturing cost of $3,000, which decreases with mass production, the Tl?loc is highly customizable for various missions. While primarily for disaster relief, its durability and adaptability make it suitable for first responder situations like police chases or search missions. The report will explain how these capabilities

Throttling Injector



MEMBERS

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THROTTLING INJECTOR

Our team is designing a throttleable pintle injector for use in a rocket thrust chamber. It will use separate fuel and oxidizer inlet ports with a movable sheath that throttles both fuels at once. It will outline the mixture ratio and steps taken to optimize flow in the design and how we throttle it.

USCG Hoist Control Systems

MEMBERS

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Cameron Brossart
Ashley Gray

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Xiaofeng Liu

MITIGATING HOIST LOAD SPIN INDUCED BY HELICOPTER ROTOR WASH

This project focuses on mitigating hoist load spin induced by helicopter rotor wash during rescue operations. A scaled helicopter system was used to quantify induced torque at various distances from the rotor blades through dynamic and static force measurements. By identifying spin hotspots and dead zones, the maximum measured torque guided the design of an active control module to counteract spin. The ultimate goal is for the implementation of the module to enhance the stability, safety, and efficiency of rescue missions.