

Sergio A. Camperos Vargas

Aeronautical Engineer | CAD Design | Simulation | UAV Development |
Product Engineering

AVAILABLE FOR FREELANCE PROJECTS AND TECHNICAL COLLABORATIONS



About me



I am an Aeronautical Engineer specialized in CAD design, structural development and engineering simulation for aerospace and advanced mechanical systems.

My work focuses on transforming concepts into manufacturable products through 3D modeling, assembly design, engineering drawings and numerical validation using CAD and CAE tools.

I have contributed to aircraft, UAV and aerospace development projects involving conceptual design, structural integration, CFD and FEA analysis, technical documentation and product development.

I enjoy working on challenging engineering problems and collaborating with companies, startups and research teams developing innovative aerospace technologies.

Areas of Expertise



CAD Product Design

Complex assembly designs and high-precision 3D modeling. Technical drawings for manufacturing (CATIA V5, SolidWorks, Solid Edge).



Structural Analysis (FEA)

Integrity validation under static and dynamic loads. Fatigue, stress concentration, and topological optimization (Ansys).



Aerodynamics & CFD Simulation

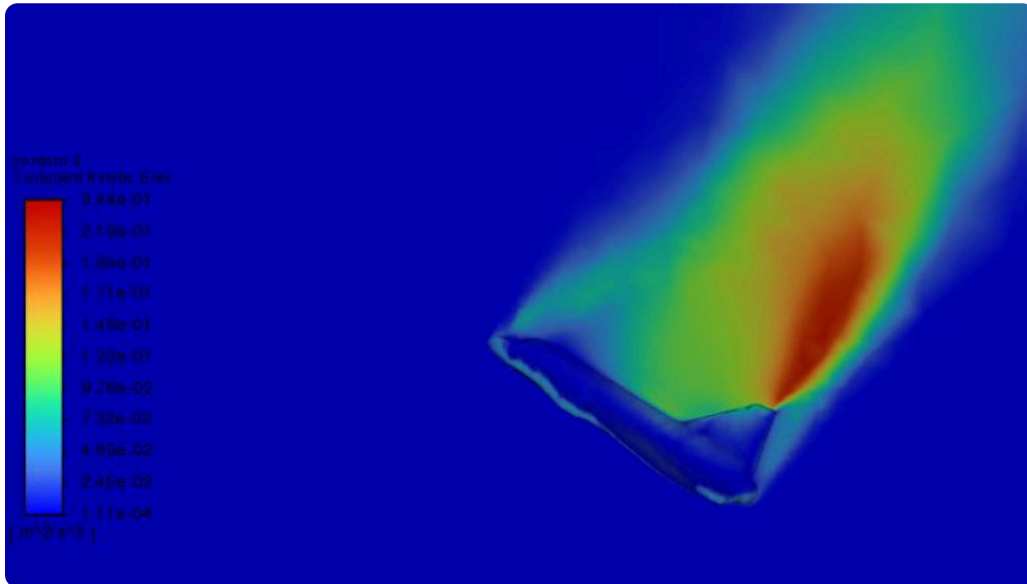
Simulation of mission profiles, thermal analyses, and transient flows for surfaces, capsules, and unmanned vehicles (Fluent, XFOIL, AVL).



Engineering Product Development

End-to-end engineering support from concept development to manufacturable designs. Experience in CAD modeling, assembly integration, design optimization, technical documentation and engineering validation for aerospace and mechanical products.

CFD Aerodynamic Validation — Stratospheric Lifting Body



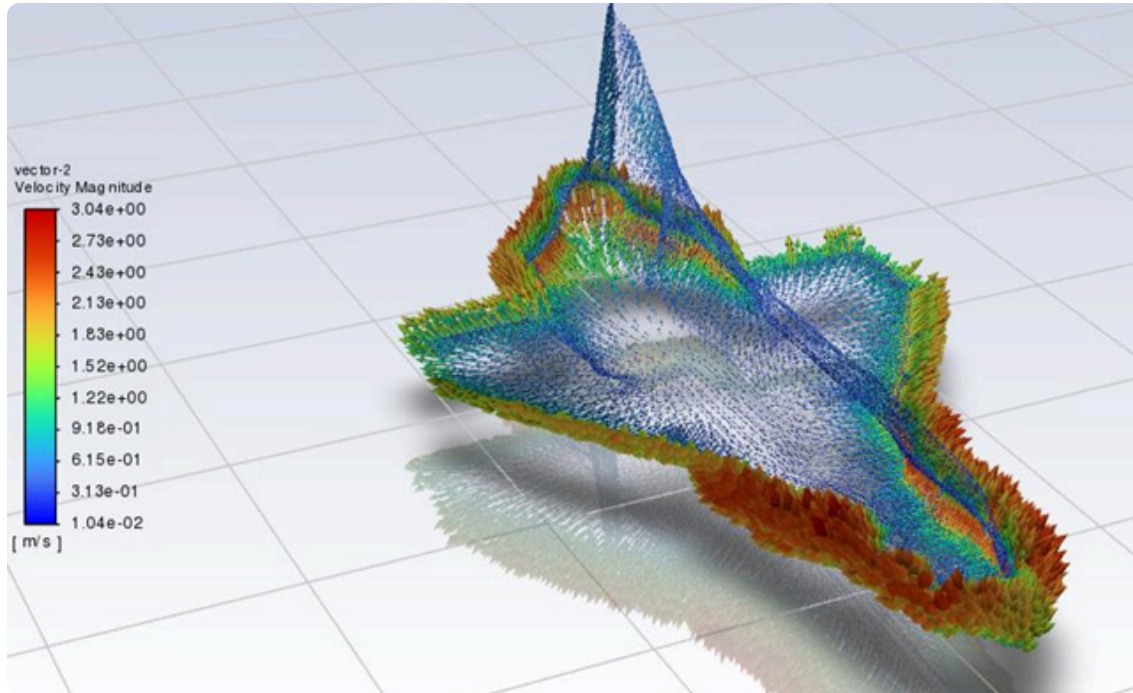
Context and Challenge

The challenge was to design the aerodynamic model for the unpowered descent of a lifting-body vehicle from an altitude of 22 km in the stratosphere. The capsule was designed to protect a critical payload: a sampling probe.

i Passive descent from the stratosphere · Precision scientific payload

CFD simulations were performed for three altitude scenarios with pressures of 103 kPa, 40 kPa, and 9 kPa, adjusting atmospheric variables and air density using Ansys Fluent under transient conditions.

Validated Descent Stability



Key Findings

Thermal Insulation

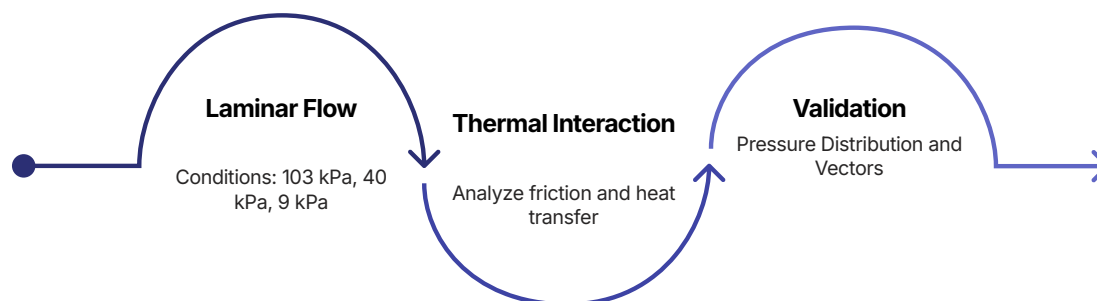
The interior of the payload compartment remains isolated from high-speed airflow.

Geometric Fit

The profile was verified to be suitable for the full mission profile.

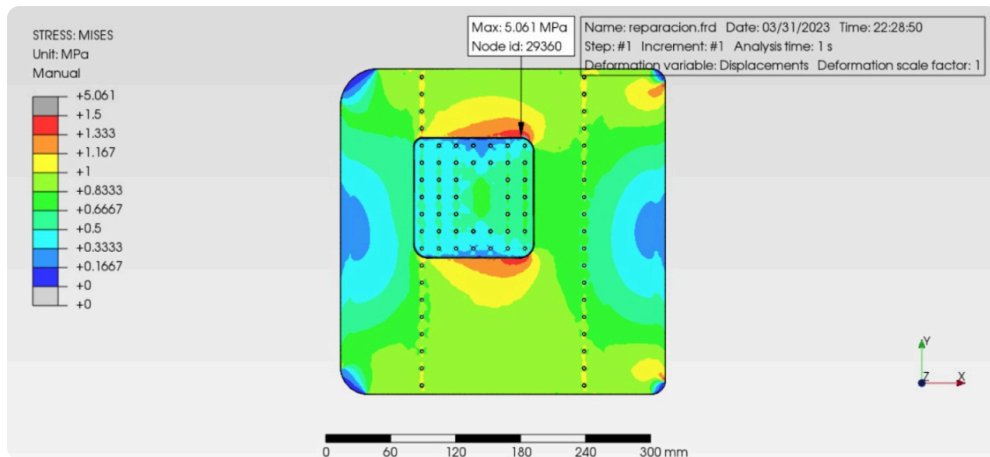
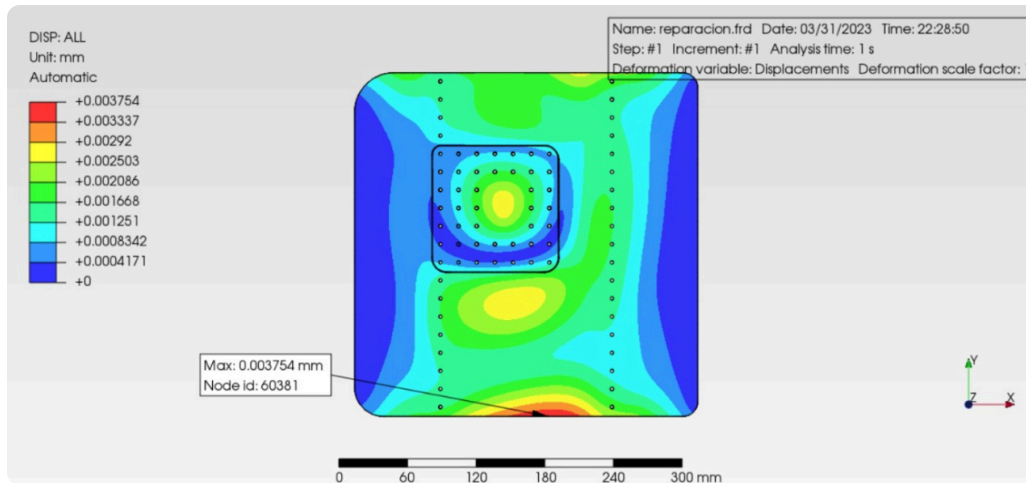
Descent Control

The vertical stabilizer effectively guides the flight path in all situations.



The pressure concentration analysis confirmed the stability of the nose-down descent, which was effectively controlled by the vertical stabilizer.

FEA Structural Validation — Repair of an Aircraft Panel



Context and Modeling Strategy

The technical challenge involved validating the structural integrity of a riveted repair patch on an aircraft aluminum skin panel subjected to static operational loads.

A discretized FEA mesh was generated and optimized in the areas of stress concentration, analyzing the interaction between the base panel, the internal stringers, and the load transfer through the rivet pattern.

- ✓ Maximum patch displacement: 0.003754 mm ·
- Critical von Mises stress: 5.061 MPa — below the yield strength

UAV Combat Climate Change — SAAB · EAFIT · Sweden Alliance

1

Digital Design

Complete CAD model of a twin-boom configuration with ribs, stringers, and a double-beam tailplane.

2

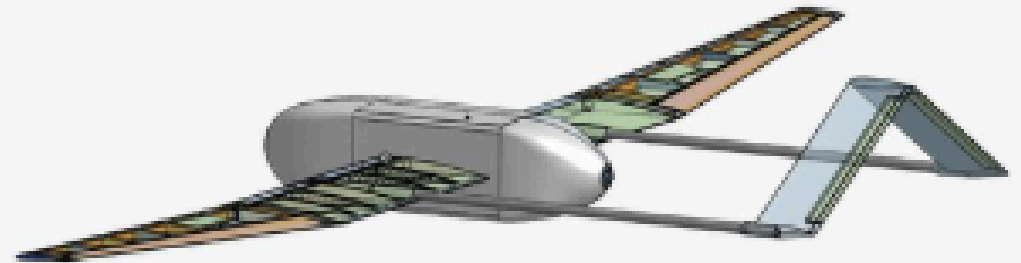
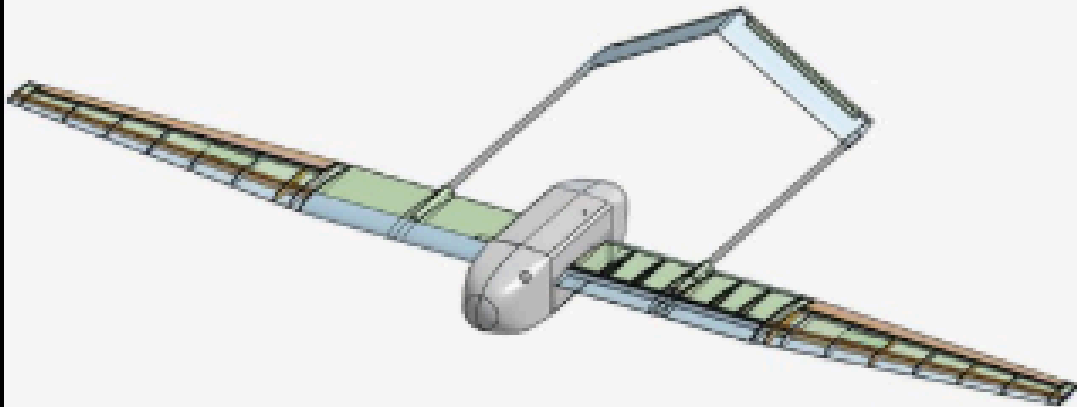
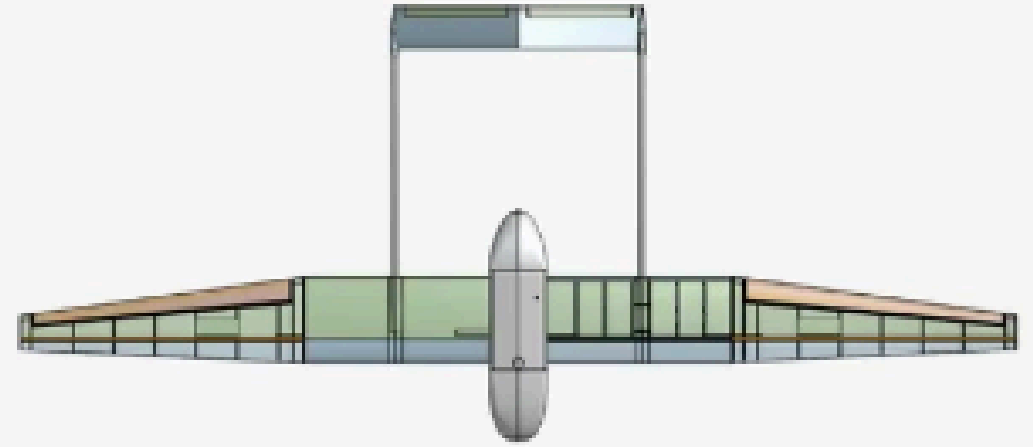
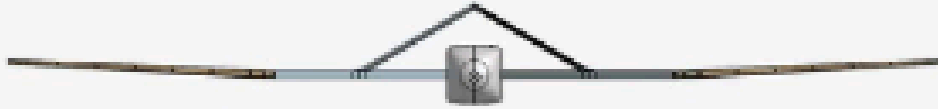
Physical Manufacturing

Transition from the CAD model to physical components: construction of a lightweight wing structure and structural integration.

3

COP16 Exhibition

Presentation and operational validation before international delegates at the UN global climate summit.

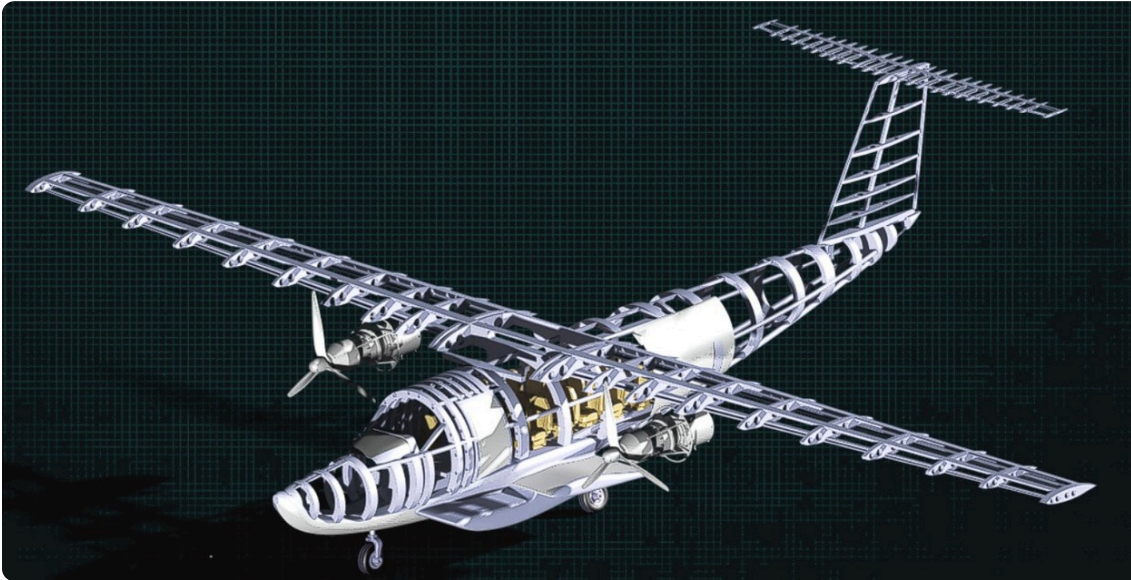


COP16 Exhibition — Global Climate Action Summit



The Combat Climate Change UAV exhibition at COP16 was a key moment in demonstrating its international relevance. The project was presented to delegates and experts, highlighting the innovative design and engineering behind this solution to climate change. The images capture the interaction with the audience, the drone's technical details, and the atmosphere at the booth, which fostered dialogue on sustainable technologies in aviation.

Conceptual Aircraft Design — AIAA RFP

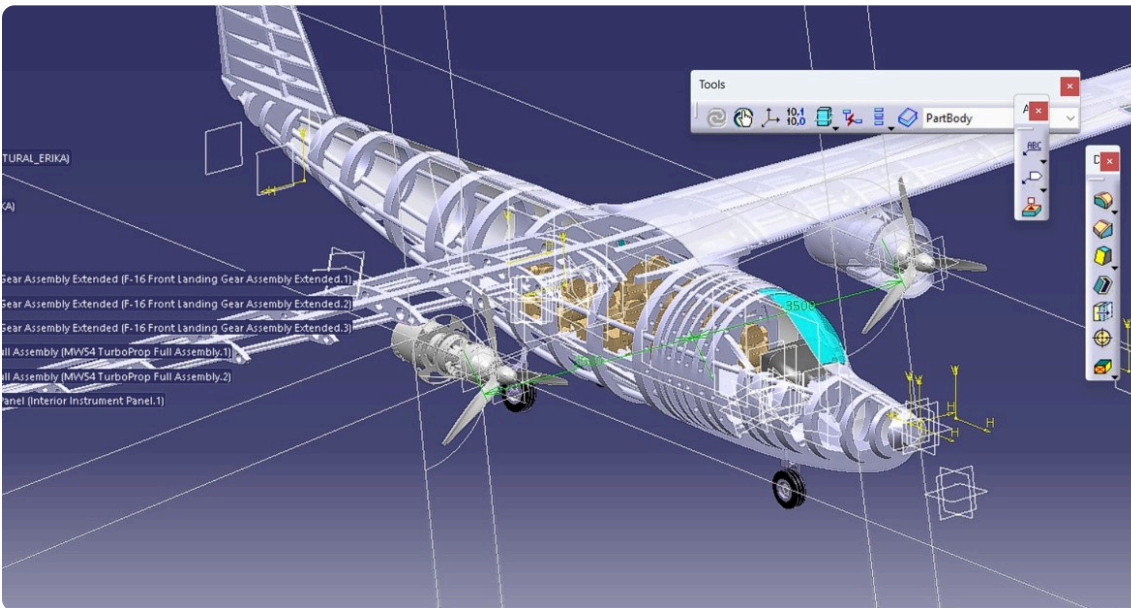


The Industry Challenge

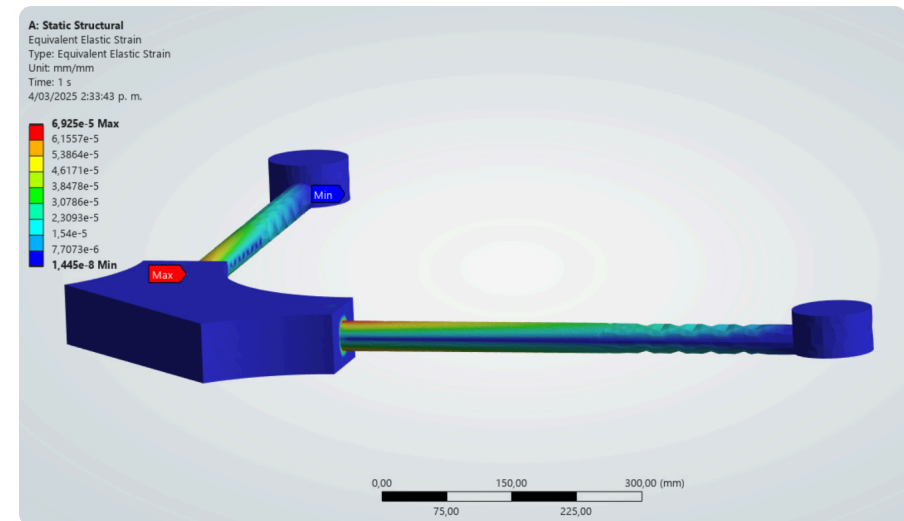
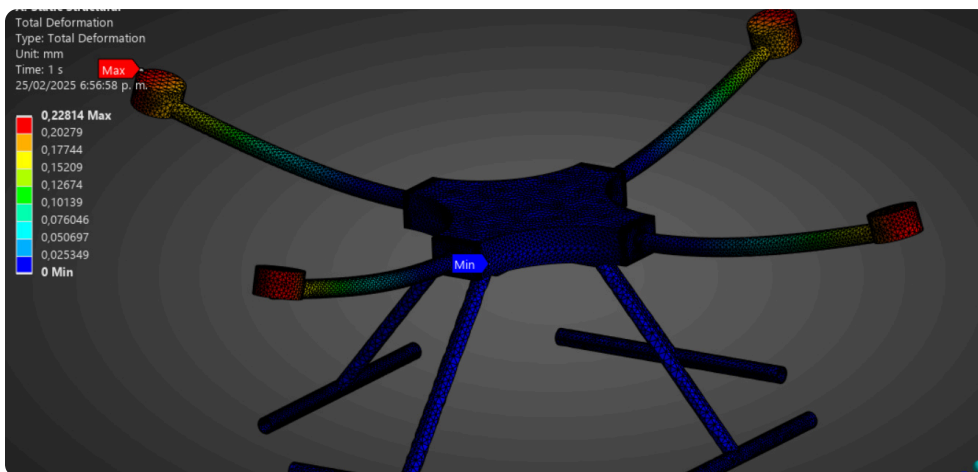
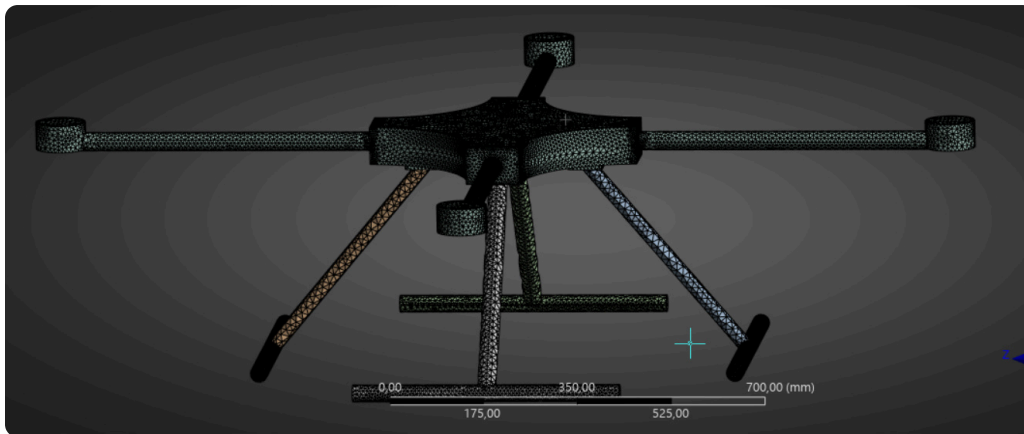
In response to the Request for Proposal (RFP) issued by the American Institute of Aeronautics and Astronautics (AIAA), an aircraft was designed from the ground up to meet the strict regulations and mission profiles of the most prominent aeronautical competition in both academic and industrial circles.

Developed Architecture

- High-wing, twin-engine turboprop aircraft
- Parametric fuselage with circular stringers
- T-tail and integration of MW54 engines
- Validation of collisions and mechanical interferences
- Preliminary center of gravity verified



Structural Validation (FEM) — Quadcopter UAV Chassis



Context and Challenge

The design of a quadcopter drone requires structural rigidity capable of withstanding asymmetric thrust loads during aggressive maneuvers. This project validated the UAV's chassis, ensuring that elastic deformations in the arms would not alter the thrust vector, which is crucial for the stability of the flight controller.

- The maximum stresses at the root of the wing remained below the yield strength, ensuring structural integrity without compromising the maximum takeoff weight.

Technology Stack

Tools and platforms mastered at the professional and academic levels



Advanced CAD

CATIA V5 · SolidWorks · Solid Edge and other design software



FEA Simulation

Ansys Mechanical · Ansys Workbench · FreeCAD



CFD Aerodynamics

Ansys Fluent · XFOIL · AVL



programming

Python · MATLAB



Normative

ISO 9001:2015 · AS9100 · SMS

Available for Freelance Engineering Projects

Do you have an aerospace or mechanical engineering challenge? I'm available for consulting, freelance projects, and CAD/CAE engineering development in compliance with regulations. [Schedule a free initial assessment consultation](#). We'll review the scope of your project, and I'll outline the technical approach to solve it accurately.

Direct Contact

 scamperos@hotmail.es

 [LinkedIn](#)

Whatsapp: [+573215954871](https://wa.me/573215954871)

 International Availability

I collaborate with aerospace companies, UAV startups, product development teams and engineering firms on CAD design.

Services include:

- CAD modeling and assemblies
- Engineering drawings
- Structural FEA
- CFD simulations
- UAV development
- Design optimization
- Technical consulting