

Islam Muradov

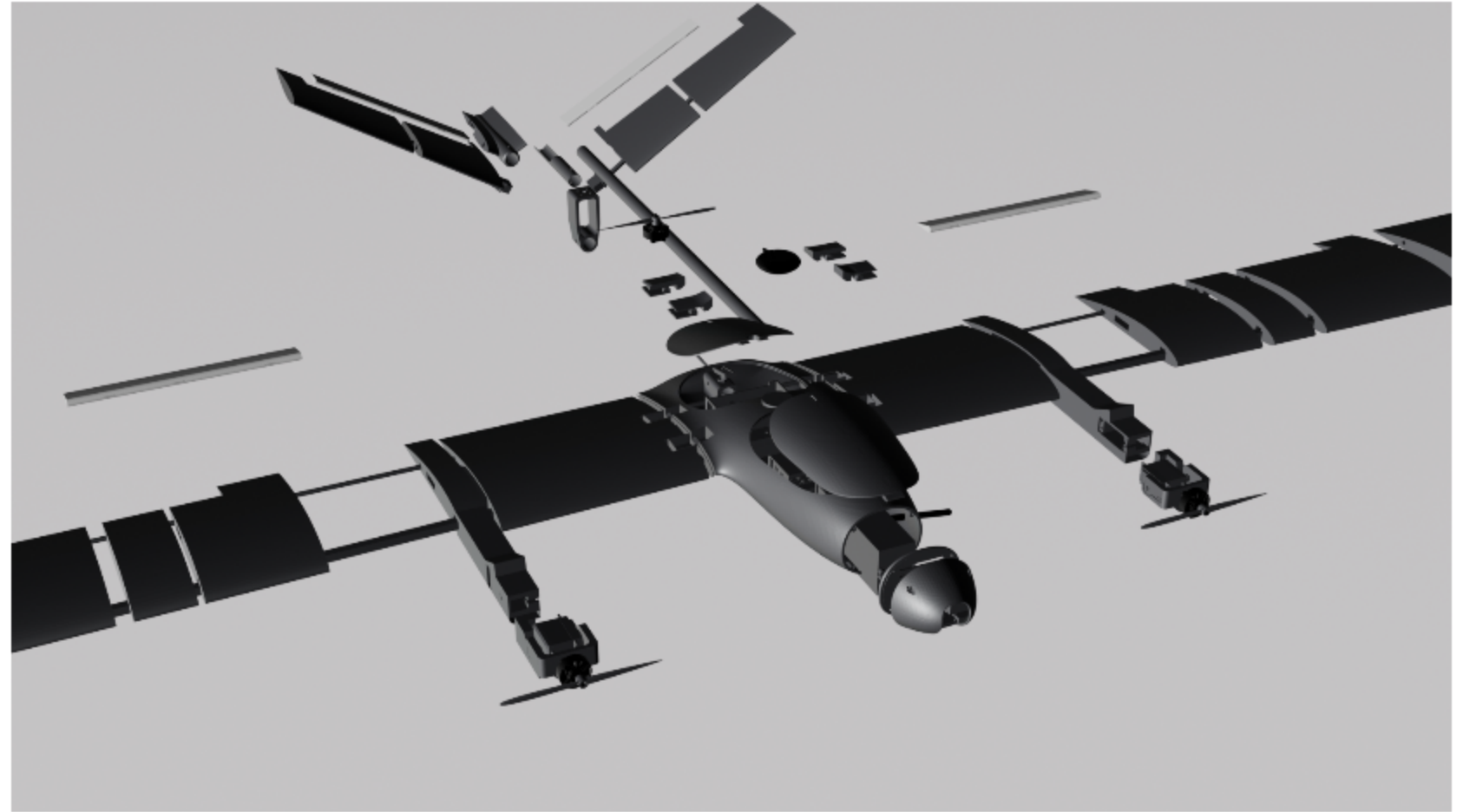
Aircraft design
Structural analysis
Simulation & controls

Koç University
Mechanical Engineering
Business Administration double major

KU.AVA UAV Team Captain

i.muradov2920@gmail.com [linkedin.com/in/imuradov29](https://www.linkedin.com/in/imuradov29)

+90 531 603 26 09 +994 50 505 03 33



Three-motor VTOL UAV / modular airframe

Aerodynamics for a tilt-rotor UAV

MECH 491 capstone / Spring 2026 / Four-person engineering team

MY CONTRIBUTION

Led aerodynamics and CFD; developed MATLAB code for tilt-servo torque calculations.

FLIGHT RESULTS

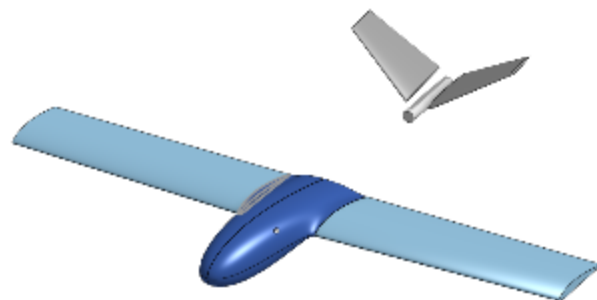
Team demonstrated stable VTOL, hover-to-cruise transitions and autonomous waypoint flights.

0.386 N·m

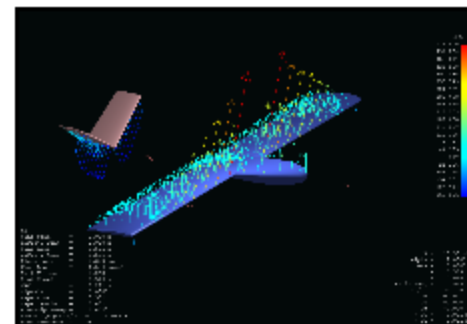
Calculated tilt-servo torque



3.4 kg team-built prototype during integration and testing



Wing and tail configuration



Lift coefficient / 3.7% difference vs. Fluent

A repairable, modular UAV fuselage

KU.AVA / Fuselage redesign and custom CAD automation

OBJECTIVE

Replace glued sections with removable screw-and-insert joints.

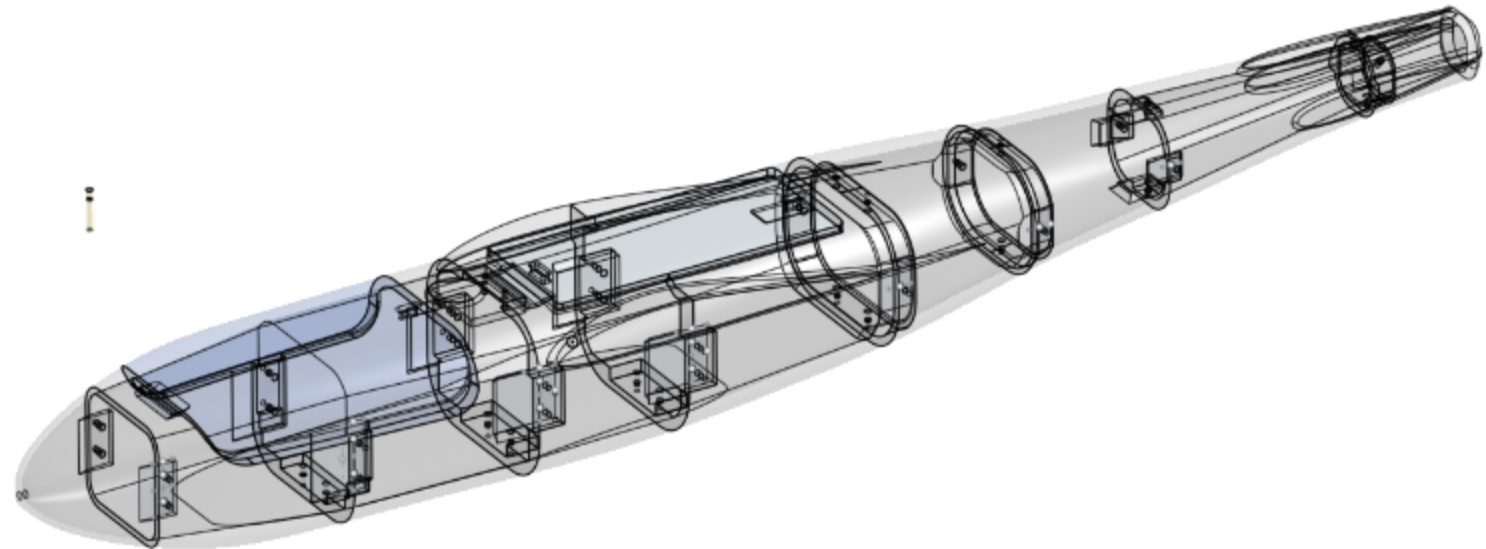
MY CONTRIBUTION

Automated bosses, holes and insert seats from one driving sketch.

28 h to 40 min

Localized repair / reprint time

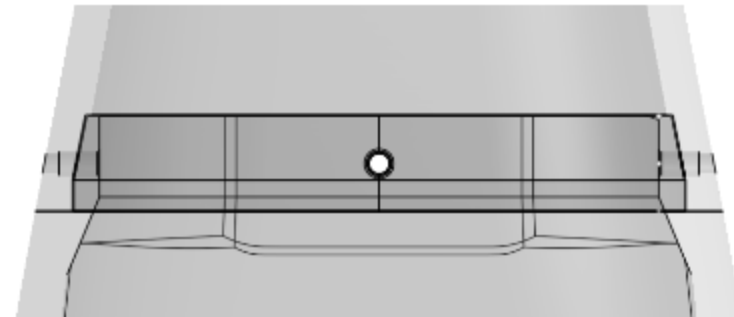
Section-only reprints reduce material waste and speed up repairs.



Full assembly / replaceable fuselage sections



Original glued design



Sketch-driven mounting point

Bolt preload, contact and failure

ANSYS Mechanical / Bolt preload and contact simulation

SIMULATION SETUP

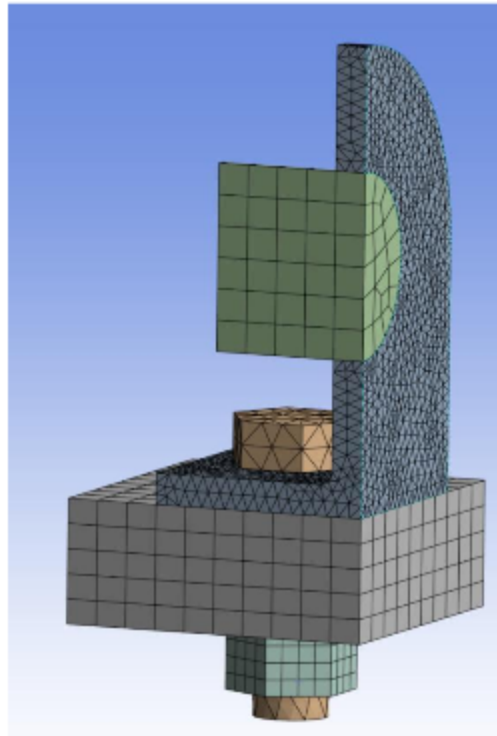
Applied 5 kN pin loading with 0 and 0.05 mm bolt preadjustment.

SIMULATION FINDINGS

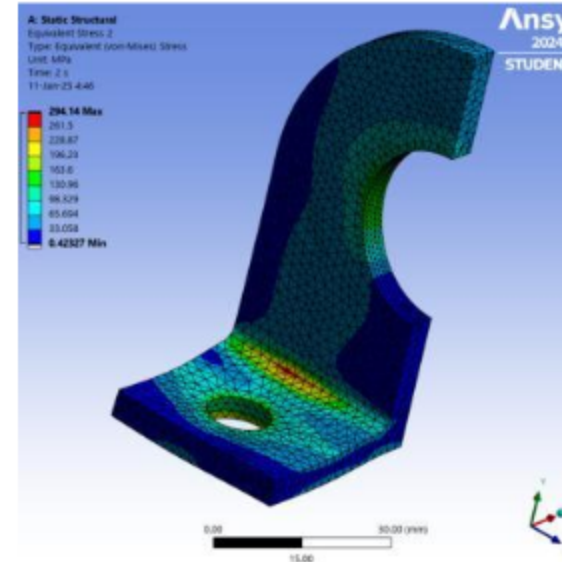
Predicted 294 MPa peak bracket stress with 0.05 mm preadjustment under 5 kN.

100 kN

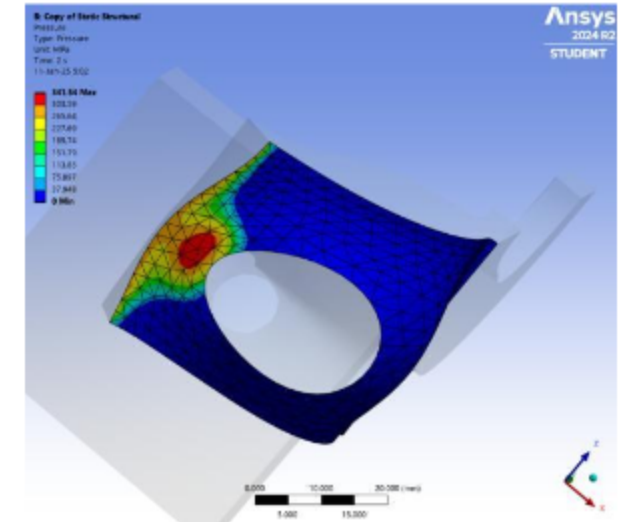
High-load simulation: contact stayed closed, but stresses exceeded yield limits.



Assembly mesh



294 MPa peak / 5 kN case



Contact pressure

Rear-view mirror vibration control

MECH 411 / Team project with Baran Cebeci / Modal and harmonic simulation

OBJECTIVE

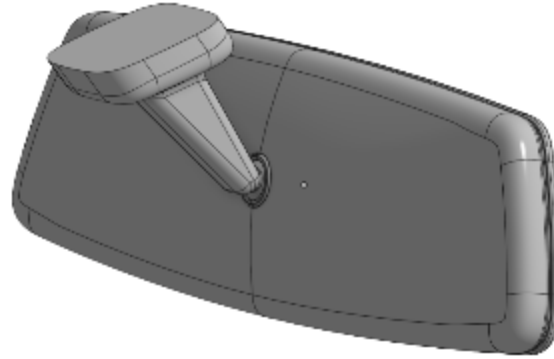
Reduce rear-view mirror vibration caused by 20–200 Hz cabin sound.

MY CONTRIBUTION

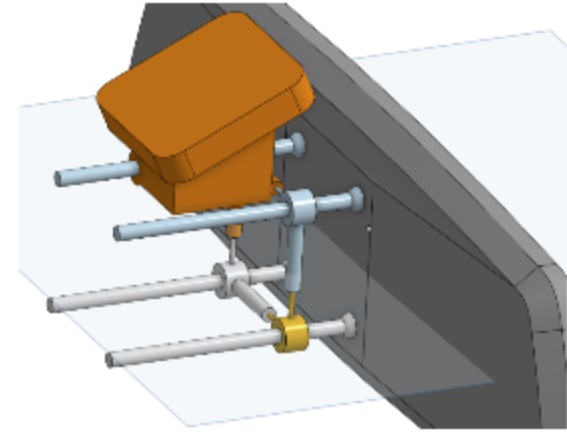
Compared 3 mount designs using modal and harmonic FEA to assess stiffness and damping.

Concept 3

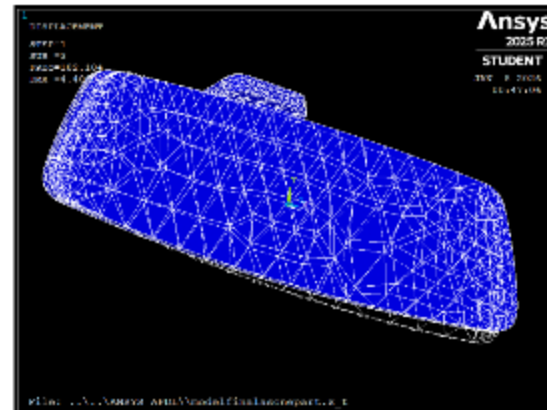
Redesigned mount with damping gave the lowest predicted vibration peak.



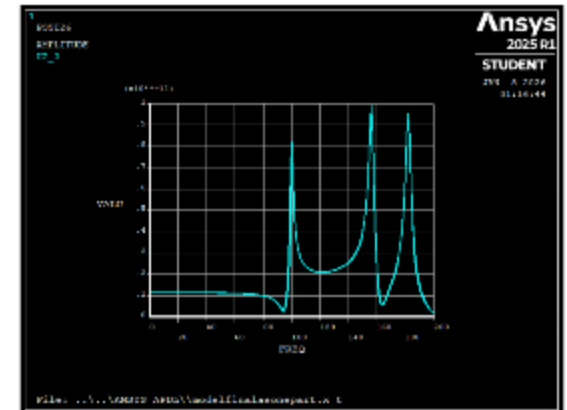
Original mounting stem



Concept 3 / redesigned mount and damping



Concept 3 / mode shape



Concept 3 / displacement vs. frequency

MATLAB heat-exchanger optimization

MECH 302 / Group 34 / Parametric thermal design

RESEARCH AIM

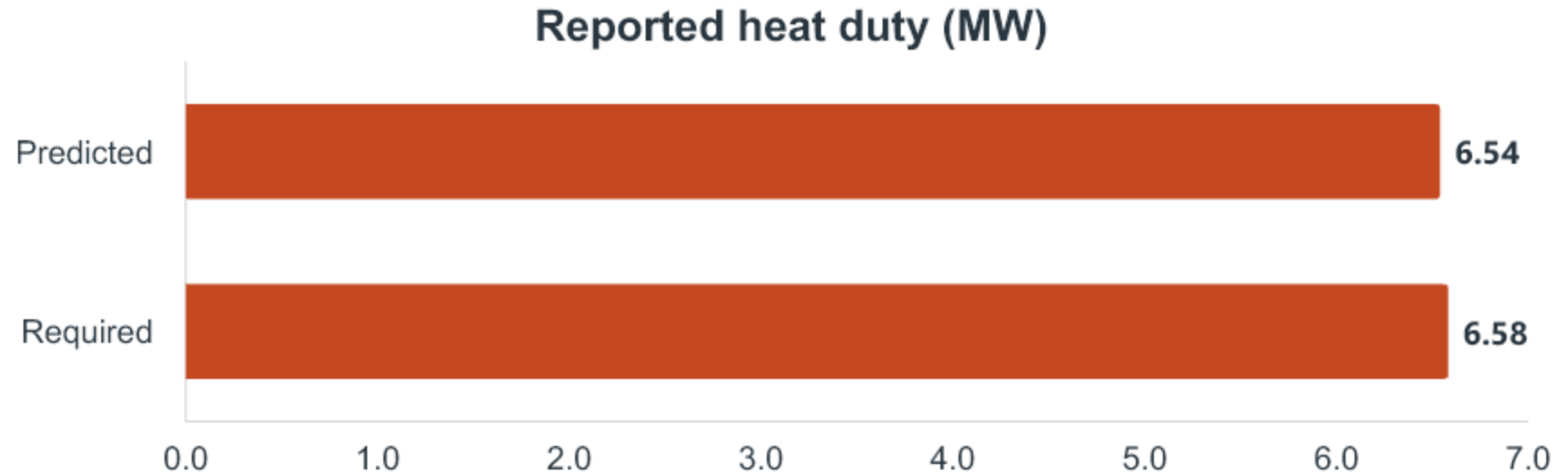
Minimize exchanger mass while cooling the process stream from 50°C toward 23°C.

MY CONTRIBUTION

Co-developed nested MATLAB sweeps linking geometry, flow regimes, fouling and mass.

CODE OUTCOME

Lowest accepted mass: 3.75 t within the sampled range and 1% duty tolerance.



0.64% below required duty

6.93 m

Tube length / 7.00 m limit

23.17°C

Predicted hot outlet / 23°C target

9,261 geometry sets, each with a tube-count sweep.
Pressure drop and pumping power not modeled.

Trajectory control for a haptic arm

MECH 444 / PHANTOM Premium 1.5 / MATLAB & Simulink simulation

OBJECTIVE

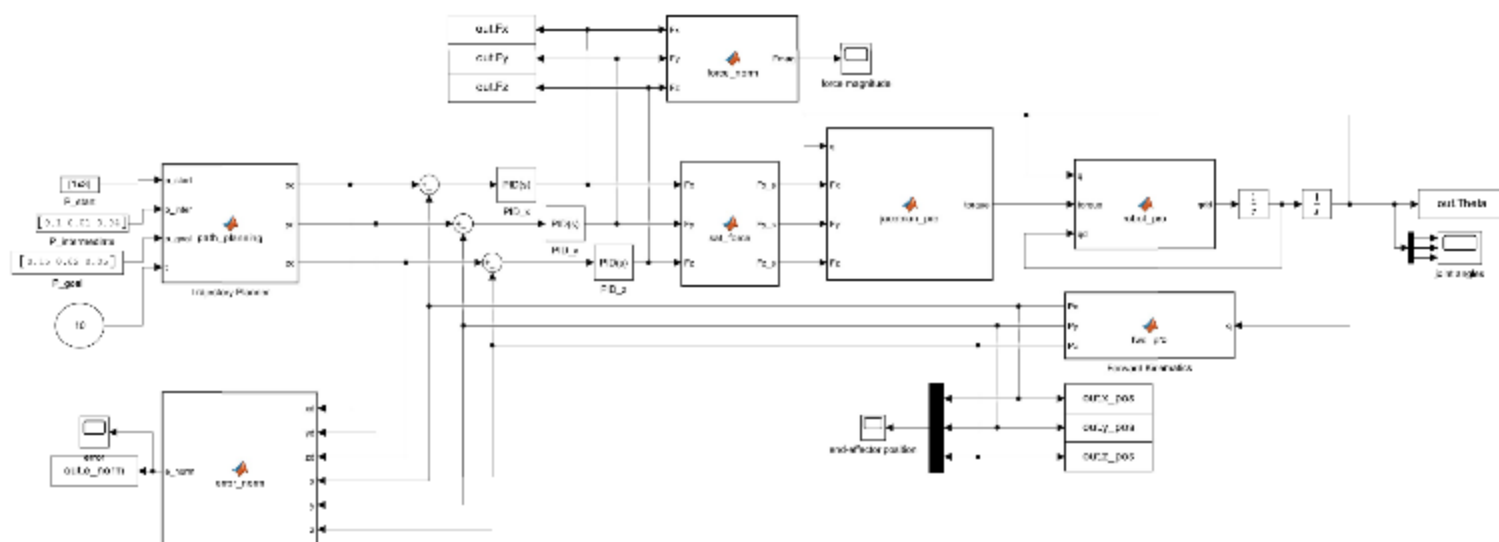
Track a two-segment 3D path and stop at the target.

MY CONTRIBUTION

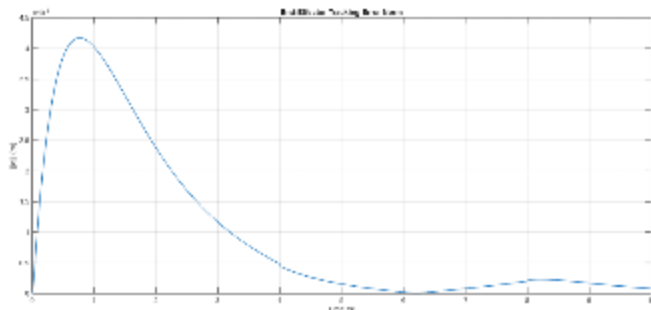
Built the dynamics model, kinematics and Cartesian PID controller.

SIMULATED RESULT

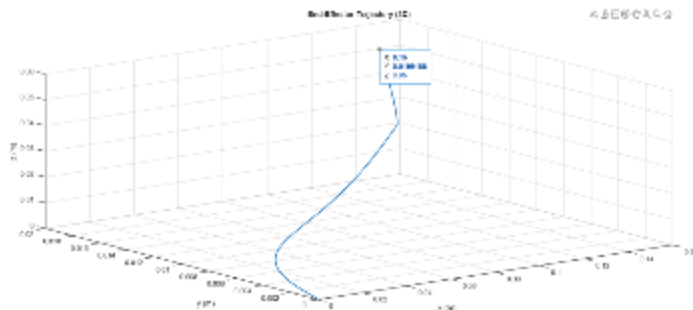
Peak error: 4.2 mm.
Below 0.5 mm by 4 s.
Path completed in 10 s.



3-axis PID control / ± 1 N force saturation per axis



Tracking error over time



End-effector trajectory

BACKGROUND

Engineering experience & capabilities

Koç University / Mechanical Engineering / Business Administration double major

GPA 3.53/4.00 / 75% merit scholarship / Dean's Honor List: 6 times

UAV leadership

KU.AVA Captain / 40-member team

Led mechanical, aerospace, electrical and software teams through UAV design and development. Coordinated competition work, from CAD and CFD to Gazebo/PX4 flight simulation.

Engineering & data tools

NX, Onshape, AutoCAD / parametric CAD & PDM
ANSYS Mechanical / static, modal, thermal & fatigue
Fluent & XFLR5 / flow, aerodynamics & stability
MATLAB/Simulink / dynamics, signals & PID
Python, C/C++ / analysis, automation & embedded code
SQL & Excel / queries, dashboards & data analysis
Arduino & Raspberry Pi / hardware prototyping

Industry experience

Silk Way Technics / Aug–Sep 2024

Quality control and base maintenance; supported powerplant work, landing gear and structural assemblies.

Azerbaijan Refinery / Aug–Sep 2025

Supported pyrolysis-system commissioning, operational checks and engineering data collection.

Teaching & communication

Thermodynamics TA / Spring 2025 & 2026

Led problem-solving sessions, supported assessment and provided structured feedback.

English, Russian, Azerbaijani: C1 / Turkish: B2