

ENES BASARAN

Mechanical & Industrial Engineer



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Portfolio Overview

*a selection of academic projects, coursework and theses completed during my university studies;
covering engineering design, analysis, manufacturing and research*

01 RC Airship

02 Beetle

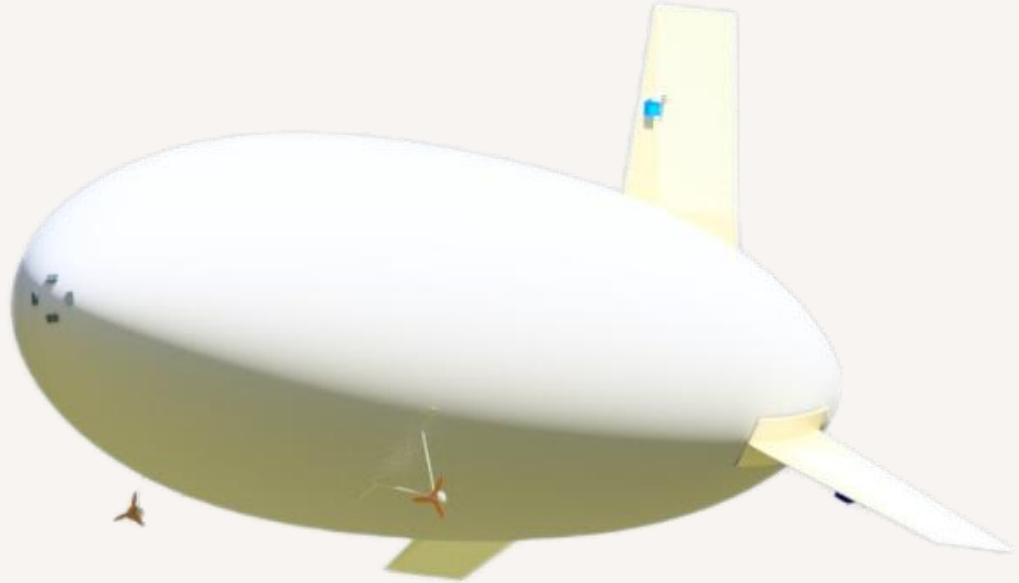
03 Student Inflation

04 Bus Body Frame

05 PCB Manufacturing

06 Thesis I

07 Thesis II



01

Designing, Manufacturing and Flight Testing of an RC Airship

01 – RC Airship

Objective

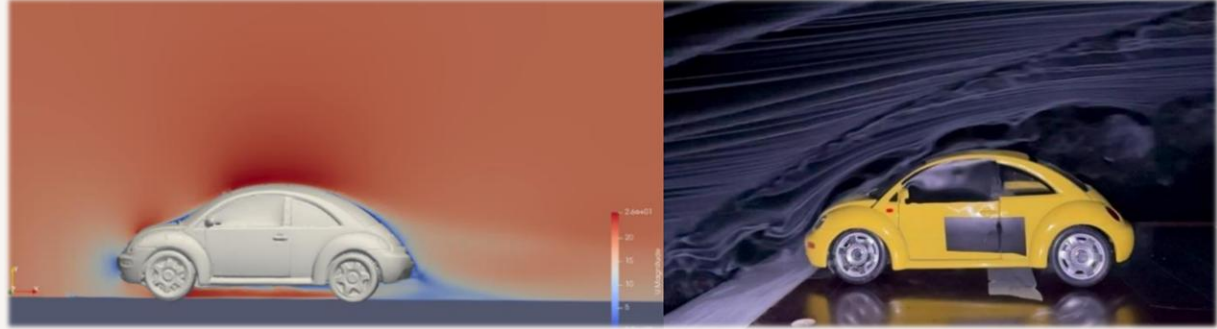
- Design and build a lightweight RC airship capable of stable and controllable flight
- Achieve neutral buoyancy and pitch-moment equilibrium under specific payload constraints

Key Activities

- Aerodynamic Sizing & Analysis
- 3D CAD & Mechanical Design
- Prototyping & Assembly
- Flight Testing & Troubleshooting

Skills & Tools

- 3D CAD Modeling & Technical Drawing (Autodesk Inventor)
- Test Bench Instrumentation
- Numerical Integration & Excel Modeling
- Soldering & Circuit Wiring



02

Analysis of a Vehicle: Wind Tunnel Testing and CFD Validation

02 – Beetle

Objective

- Determine the aerodynamic drag and lift forces on a 1:18 scale vehicle model through wind tunnel testing
- Validate experimental results against CFD simulations and manufacturer data

Key Activities

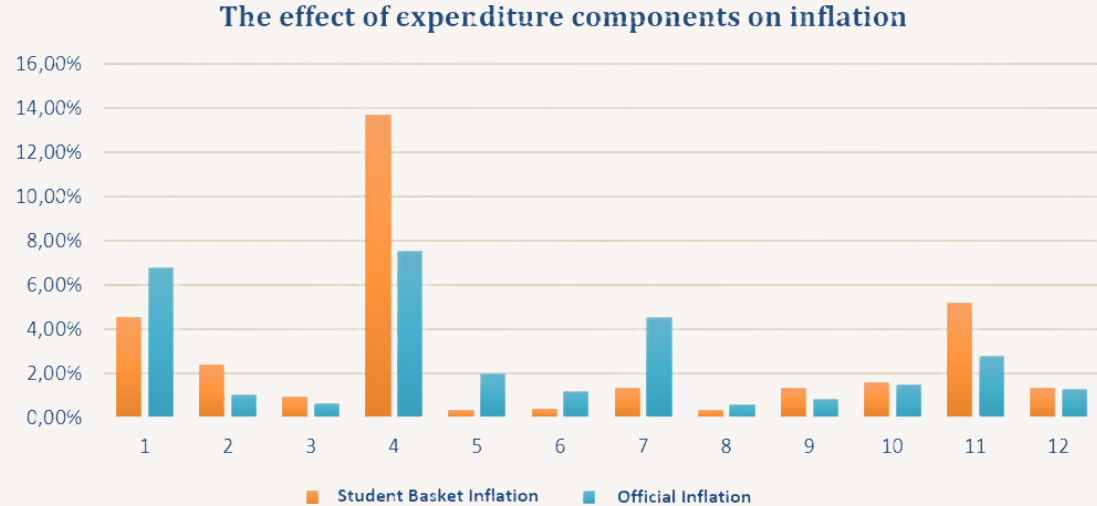
- Model Preparation
- Wind Tunnel Testing
- CFD Setup & Simulation
- Data Reduction & Analysis
- Flow Visualization & Error Analysis

Skills & Tools

- Test Design & Data Acquisition
- Sensor Calibration & Instrumentation
- Data Analysis & Numerical Methods
- CFD Modeling & Simulation (OpenFOAM)
- Uncertainty Assessment

03

Analysis of Student Spending Habits & Inflation Modeling



03 – Student Inflation

Objective

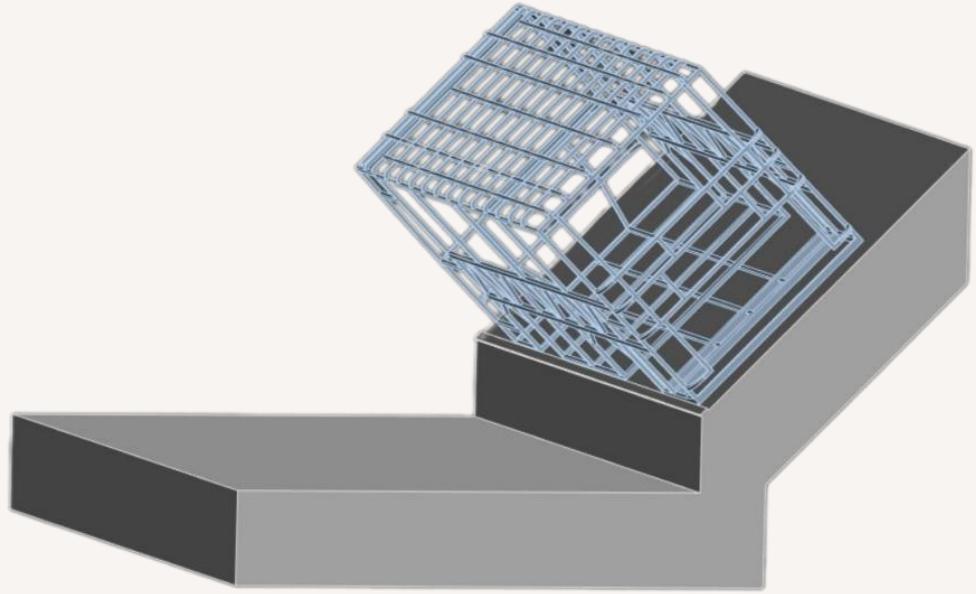
- Conduct an empirical, comparative study on student spending habits across four cities in Turkey and Germany
- Model a customized consumer basket to quantify the student specific inflation rate and purchasing power loss experienced by university students

Key Activities

- Survey Design, Sampling & Data Collection
- Data Preprocessing & Demographic Segmentation
- Consumer Basket Construction & Weighting
- Inflation Calculation & Comparison
- Data Visualization & Interpretation

Skills & Tools

- Empirical Research Design
- Index Number Theory & Weighted Price Calculation
- Exploratory Data Analysis & Data Cleaning
- Socio-Economic Analysis & Interpretation



04

Bus Body Frame Design & Rollover Crashworthiness Analysis

04 – Bus Body Frame

Objective

- Design and evaluate a bus body frame for rollover crashworthiness in accordance with UN ECE R66 safety requirements
- Assess structural deformation and residual-space integrity under rollover loading using dynamic simulation

Key Activities

- 3D Bus Body Frame Design
- Material Selection & Model Preparation
- Rollover Simulation Setup
- Mesh, Contact & Boundary Condition Definition
- Deformation & Structural Response Analysis

Skills & Tools

- 3D CAD Modeling & Technical Drawing
- Numerical Simulation & Model Setup
- Finite Element Analysis & Explicit Dynamics (ANSYS)
- Structural Mechanics & Crashworthiness Analysis
- Engineering Standards & Compliance Analysis (UN ECE R66)



05

PCB Manufacturing Process Planning and Optimization

05 – PCB Manufacturing

Objective

- Design and standardize a manufacturing process to improve efficiency, repeatability, and production flow
- Identify capacity bottlenecks and develop improvement measures to achieve target shift outputs

Key Activities

- Workstation Layout & Process Planning
- Process Standardization
- Labor, Machine & Unit Costing
- Bottleneck Analysis & Workload Balancing
- Defect Handling & Rework Planning

Skills & Tools

- Lean Manufacturing Principles
- Yamazumi Analysis
- Value Stream Mapping
- Visual SOP Development
- Flowcharting
- CNC Machining (UCCNC) & Workshop Equipment Operation

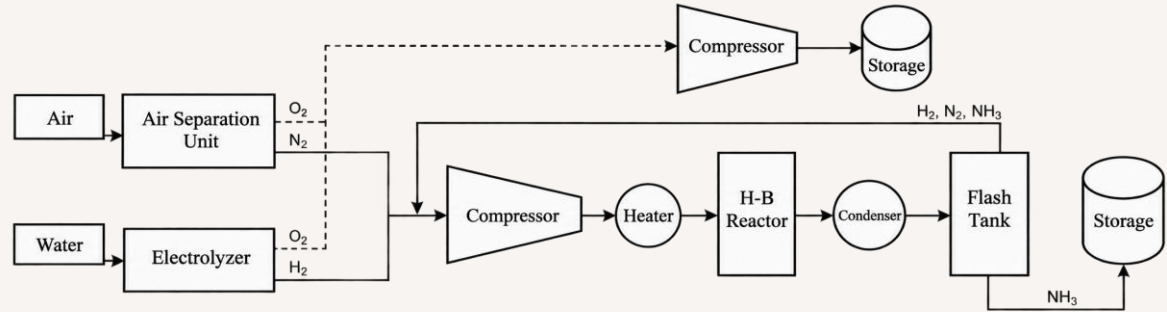


Figure 1: Flow Diagram of Ammonia Production

06

Thesis I: Evaluating Hydrogen Carrier Production Systems

06 – Thesis I

Objective

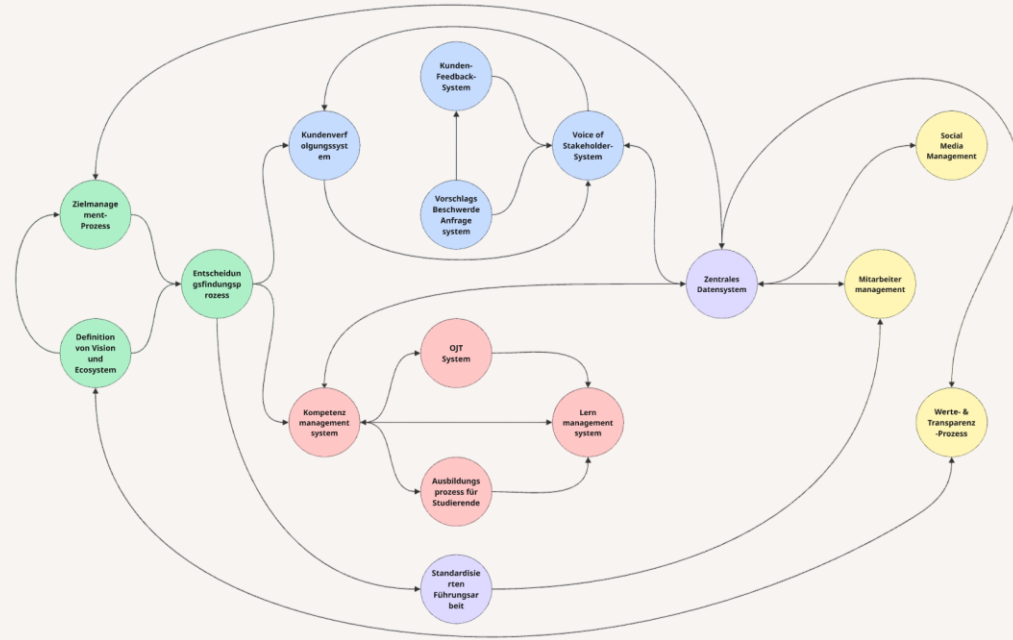
- Evaluate and compare six hydrogen carrier production systems from technical, economic, logistical, and sustainability perspectives
- Assess their feasibility for large-scale hydrogen storage and transport

Methodology

- Literature Review & Data Collection
- Large-Scale Scenario Modeling
- Techno-Economic Analysis & Cost Modeling
- Multi-Criteria Evaluation

Skills & Tools

- Technical Data Synthesis
- Process Flowsheet Design
- Engineering Cost Estimation (CAPEX/OPEX)
- Benchmarking & Trade-Off Analysis
- Industrial Feasibility Assessment



07

Thesis II: EFQM Based Industry 5.0 Learning Factory System Design

07 – Thesis II

Objective

- Develop an EFQM 2025-based management and system design concept for Industry 5.0 learning factories
- Translate EFQM requirements into an integrated process architecture and checklists

Methodology

- Systematic Literature Review & Gap Analysis
- EFQM 2025 Criteria Analysis
- Requirements & Method Mapping
- Conceptual System Architecture Design
- Input-Output-KPI Framework Development
- RADAR Alignment & Concept Review

Skills & Tools

- Process Architecture & Systems Design
- Workflow Design & Process Mapping
- KPI Design & Performance Measurement
- EFQM 2025 Framework
- Stakeholder & Ecosystem Analysis

THANK YOU

Do you have any questions?

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