



DESIGN PROJECT PROPOSAL FORM

Academic Year	2022 -2023	Semester	Fall <input type="checkbox"/> Spring <input checked="" type="checkbox"/>
Project Type	Research <input type="checkbox"/> ME 411 Thermal & Fluid Design <input type="checkbox"/> ME 413 Mechanical Design <input checked="" type="checkbox"/> ME 415 Robotics & Control Design	Application <input type="checkbox"/> ME 412 Thermal & Fluid Design <input type="checkbox"/> ME 414 Mechanical Design <input checked="" type="checkbox"/> ME 416 Robotics & Control Design	
Advisor	Asst.Prof.Dr.Çağlar UYULAN		
Project Title	Automatic Flight Control System for Landing on Moving Naval Platforms		
Purpose and Scope	<p>Ship-deployed Unmanned Aerial Vehicle Systems are UAV systems that can be deployed on the ship to conduct surface reconnaissance and transfer the detected and identified target information to the relevant units. Take-off and landing from a moving ship are one of the basic needs of all flying platforms deployed on board. This need has been met by placing additional equipment on the runway in some UAVs in use, by monitoring and interpreting the signs and markers on the landing area by the pilot in manned systems. This study aims to develop algorithms and software that will autonomously perform the landing and take-off of Ship-Boarded Unmanned Aerial Vehicle Systems on a moving ship, using the existing camera infrastructure, without adding to the user loads on it. Although the waves in the sea seem to move randomly, their movements can be based on a stochastic model. The proposed project will use this information as a starting point and accordingly reduce the landing and take-off system to two simultaneous processes. The first of these is the landing-take-off adaptive control process with a rotary-wing (quadrotor) on a platform with known stochastic motion model and position angles; The second is an adaptive forecasting process that blends visual measurements with the position and inertia data of the air platform, predicts the stochastic model of the surface platform, and predicts the position and position angles of this stochastic model. Within the scope of this project proposal, the surface platform model and the aircraft model will be handled in an integrated manner and the aircraft will be controlled with the model predictive control (MPC) method.</p>		
Work Packages	<ul style="list-style-type: none">• Modelling and Design of a Quadrotor System• Developing Control System and Estimation Algorithms• Real-time Test, Validation and Integration Developed Algorithms• Experimental Design and Construction of Low-Budget Test Platform• Demonstration		
# of Team Members			



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**This section to be
filled by the
Commission**

The Project Proposal

- is approved.
- should be revised considering the following suggestions:



The projects are aimed to prepare students to attain the following program educational objectives:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Therefore, the final report of the project should contain the following:

- i. Definition of the design problem and its limitations
- ii. Theoretical information about the topic, standards and patents
- iii. Different design options and selection criteria
- iv. Optimal solution with appropriate selection criteria
- v. Cost accounting, feasibility, compliance with regulations and standards, environmental impacts, and compliance with ethical rules
- vi. Engineering drawing and presentation methods for presenting