

SEMS: RESEARCH PROJECT DESCRIPTION

1. Project Background and Description

A project title and description with clear aims (300 words)

Solar-powered UAV/quadrotor based intelligent sensing/monitoring of disasters for awareness and management

UAV based remote sensing and monitoring present a cheaper alternative to satellite imaging, with the potential for superior data capture rates and precision. As such, nowadays, there is a significant demand for UAV based applications in the field of remote sensing and monitoring of situations, threats and natural disasters for the economic benefit any country including UK and Mexico. The loss of lives, assets and economic output that accompany natural disasters can be minimised enormously by prompt action based on sufficient and timely information from UAV based monitoring and sensing. Some potential applications of UAV based sensing and monitoring include precision agriculture, environmental monitoring, habitat monitoring, flood monitoring, leaks detection in water distribution network, infrastructure security monitoring, traffic control and healthcare monitoring. This research proposes sensing and monitoring solutions with UAV for these challenges. The research problem requires that a fixed wing miniature UAV or a quadrotor with sensors payload be designed, fabricated and tested. To curtail environmental pollution, the system will be designed to be powered by solar energy. Control approaches to ensure sophisticated control of the system will also be developed.

2. Project Scope

Three research project objectives

- A solar-powered fixed wing UAV/quadrotor platform will be designed, modelled and fabricated.
- A suitable application will be identified and most suitable sensor package for the application will then be integrated to the system.
- The control approaches for the system will be developed using artificial/machine learning based approaches.
- The efficacy of the developed system will be tested in a real-time scenario.

3. Desired Skills from the Student

Key skills needed for the PhD project

Basic concepts of engineering design, engineering instrumentation, control and tele-communication

4. Supervisory Team

Add supervisory team details

Primary: (Name (inc title): Dr M Hasan Shaheed

Secondary: (Name (inc title): Dr Ranjan Vepa

Additional: (Name (inc title)/ department/company if outside SEMS): Dr Akram Alomainy, EECS