

Project Overview:

Habitat restoration and other land management practices are vital to the continued health of open spaces, ecosystem functioning, and provision of ecosystem services, e.g., forestry, and agricultural production. On-the-ground ecological land management activities can be disruptive and require extended land modification, transitioning the state of the art for land management to UAV based work. We propose a novel technique to improve and speedup ground-based ornithological surveys for nesting migratory birds using mounted Long Wavelength Infrared (LWIR) and visual spectrum sensors on a multirotor UAS platform. With the ability to downlink data in different bands, we are able to automatically derive GPS coordinates of potential bird nests for in-field verification and ecological land assessment.

Multispectral Camera:

We are building a multispectral camera that is more compact, cheaper, and higher resolution than current commercial products. Current commercial products are not ideal for our project. Visible light cameras combine wavelengths in the range between 300nm and 1000nm, making it difficult to isolate different bands. The excellent camouflage of birds nests make them too small to identify reliably using RGB cameras. By developing this multispectral camera we can easily highlight bands of environment, differentiating vegetation habitat of birds. We can broaden the amount of information that we collect by building the multispectral camera so that we can locate bird nests more accurately and locate specific plant life. By capturing images with different spectral filters, we can get information outside of the visible light spectrum. The information we gather will give us other points of interest that may help us locate birds nests more consistently.

System Integration:

-- Why?

We need an efficient way to (i) gather all the data from various sensors and cameras, (ii) package them together and (iii) transmit them to the base-station computer for analysis of data.

-- How?

We build a system consisting of flight controller which is responsible for movement and tracking positional information, and cameras that record visual input in multiple spectrums. This data is aggregated and packaged by a microprocessor, and then transmitted over radio.

-- What did we (or will we) achieve?

We will have a stable system that can gather and transmit data in real time.

