

Application of Drone Technology Towards Economic Benefit of Southwest Georgia

By

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Though drone technology has found significant inroads in law enforcement, military battlefield surveillance and combating terrorism, its full potential in civilian application has just begun. Southwest Georgia's economy is primarily dependent on agricultural commodity cultivated by large farmers controlling huge tracks of land. Aerial photography and sensing of health of the crops will provide them a tool to maximize the return of investment.

The paper will review some of the other civilian applications such as disaster response, fire control and damage assessment, search and rescue etc. apart from drones' usefulness in agriculture. Various environmental considerations such as prevailing wind and temperature in selecting drones will be highlighted. Operating cost, safety, portability, interchangeability of payloads are some of the other consideration in selecting the drone.

One of the first projects in flying an agricultural drone is to equip it with a sensory device to measure the vegetative index of a crop which will measure the green growth of a plant giving a possible indication if additional fertilizer is needed in a specific part of the field. Both visible and near-infrared images are commonly combined to produce multi-spectral images by software supplied by camera vendors. Normalized Difference Vegetative Index (NDVI) is a multi-spectral standard obtained by converting the digital data to numerical values and are normally used worldwide to measure and monitor plant growth in applications such as precision agriculture, assessing fire hazards, monitoring droughts and other environmental projects.

The goal of the present project is to assemble a drone with commercially available components and a high resolution camera (Go-pro Hero HD) by Albany State University engineering students. They also will learn to program the drone to fly autonomously in a predetermined path at a given altitude and speed, setting out the waypoints in a Google map. Subsequently an infra-red camera will be acquired and NDVI data generation of large tracts of land attempted.

In the first phase of this project, modest funding has been secured from Georgia Space Grant Consortium, and couple of commercially available drones was purchased to gain operational experience to fly and record high quality video images from different altitudes which will be presented in the conference. Autonomous flights and flights with infra-red camera will be attempted next. In the second phase we will attempt to build a drone to our own specifications based on the knowledge and experience gathered thus far. It is hoped that by the end of academic year 2015-16 all phases of the project will be completed.