

IPRO 312: Unmanned Aerial Systems



Spring 2011



Organization

Major Tasks

Design/Assemble an aerial vehicle capable of-

- Autonomous take-off & landing
- Waypoint navigation via GPS co-ordinates
- Automatic target search & detection
- Analysis of target
- Using sensors inputs
- Going in safety mode/manual control

GROUND STATION

AUTO PILOT

VISUAL

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Potential Markets:

- Military
- Law Enforcement
- Agriculture
- Construction
- Maps
- Customs and Border Protection
- Wildlife and conservation



The Wright Brothers created the single greatest cultural force since the invention of writing. The airplane became the first World Wide Web, bringing people, languages, ideas, and values together. ~Bill Gates

The use of Unmanned Aerial Systems (UAS) for intelligence, surveillance, reconnaissance as well as in search and rescue is rapidly expanding in both civilian and military applications at an unprecedented rate which was not foreseen a decade ago. Accordingly, there are significant job opportunities in this field and it is expected that this will continue to grow in the next decade. The design of UAS is truly an interdisciplinary task as it requires team work with expertise in diverse areas ranging from aircraft design to autonomous flight, video and data transmission to visual object recognition, the operation of a ground station such as real time data analysis and antenna tracking.

This IPRO project is developing an electric powered low cost UAS that utilizes more autonomy than current UAS designs. Visual is to be done by using image processing algorithms coupled with position determination from GPS receivers and other onboard sensors. The data acquired will then be transmitted to a ground station for post processing and prioritization. The design of the UAS would require the selection or construction of a stable airframe with the flight characteristics required for high quality images and video as well as decent endurance and range for the surveillance of large areas. Furthermore signal transmission, reception and processing methods will need to be developed to ensure functionality at a multitude of ranges and conditions, with provisions being made for overlapping signal coverage.

