



Introduction

Flying in combat or surveillance missions is a very demanding and dangerous task. In order to help save lives, unmanned aerial vehicles have gained great interest. They can be used for combat missions, surveillance, and locating disaster victims simply by a controller on ground without having to put a life at risk.

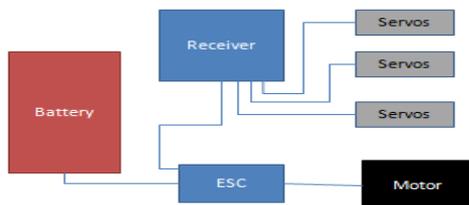
Objective

Design an Arduino based autopilot Aircraft which will handle stabilization and navigation and provide live video while it's flying, to be utilized for testing unknown territories, surveillance, or for news stations or weather stations live feed, without the need to put someone in danger.

System Overview

- The first objective was to obtain a stable setup of an airplane utilizing the XX Airplane frame, LiPo (Lithium Polymer) battery pack, Electronic Speed Control(ESC), motor, Receiver, and Servos.
- The battery pack allows the ESC to power the motor and receiver.
- The ESC acts as a power source and regulates the speed of the motor; the ESC was plugged into the receiver's throttle channel, and connected between the battery pack and the motor. The receiver was connected to the servos, and ESC. The receiver's antenna receives the signals from the transmitter on ground and passes to signals to the servos or ESC which will then, respond with the actions submitted.

Electronic Set-Up for RC Airplane



System Overview

The servos are connected to rudder (yaw), elevator (elevation) and throttle (speed), they control the gears that are linked to the arms, when transmitter on ground sends a signal, the receiver picks up the signal and sends it to the corresponding servos which will control the arm's action and push or pull the rod.



Implementing ABAS

MultiWiiPro (Autopilot

Chip/microcontroller: includes gyroscope(senses yaw and pitch of plane), accelerometer, barometer, magnetometer



3DR Radio Telemetry Kit:

AT 915 Mhz, the telemetry allows data to be transferred between the Aircraft and the Controller using MAVLink protocol. Can be used to give aircraft additional instructions while in flight



UBlox CN-06 GPS 10 Hz:

provides global position of aircraft, includes a compass to show direction in which the air craft faces.



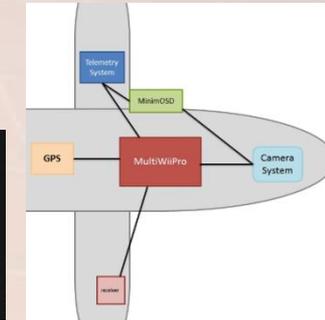
Ardupilot Mega MinimOSD: A

minimal Arduino-based on screen display board to display the data from sensors over the video.



Implementing ABAS

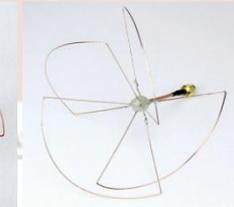
12 Channel 900 MHz Tx/Rx video system with camera: Allows the Controller to receive live video during flight.



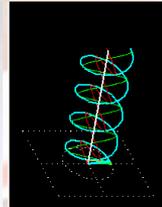
Clover Leaf Transmitter



Skew-Planar Receiver



Circular Polarization



Mission Planner

Aircraft will have a programmed mission to complete, such as going to different points located in the map and after a certain time, finish the mission and land. In order to be able to select which points the Aircraft should go to, Google maps will be utilized so that the product is customer-friendly and easy to use. The person providing the directions to the Aircraft will be able to select points, as well as see the Aircraft completing the mission.

