Project Description and Block Diagram
Surveillance Quad-copter
Semiautonomous Aerial robot

Group 3
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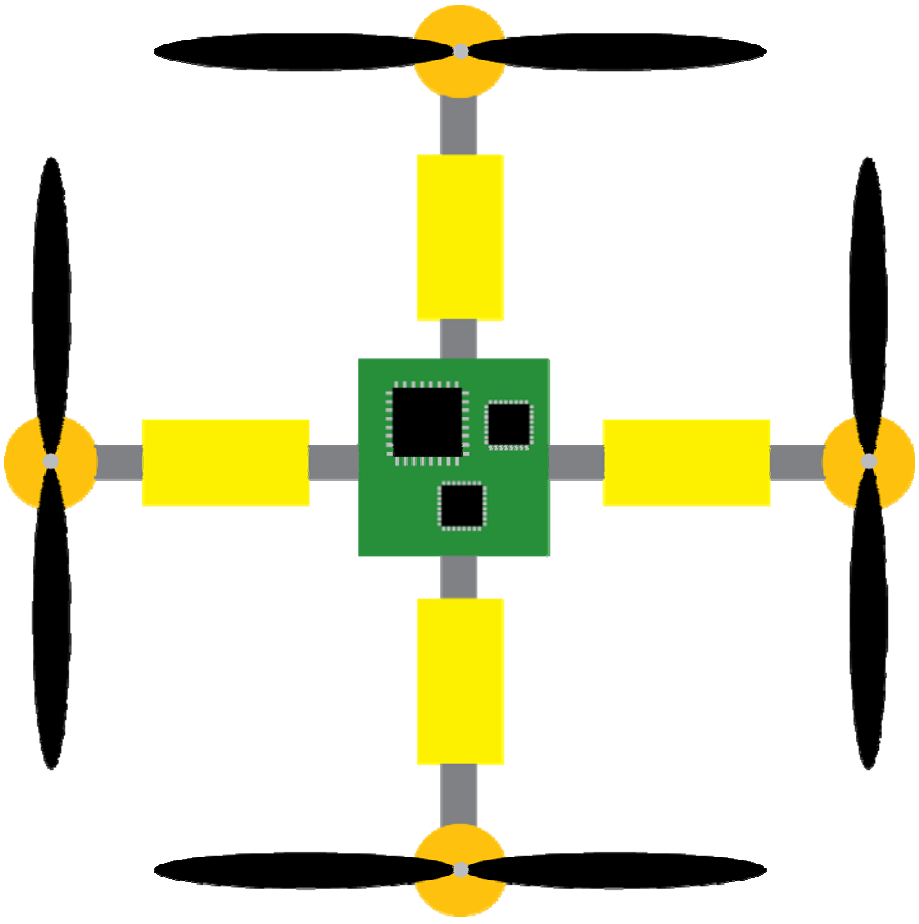
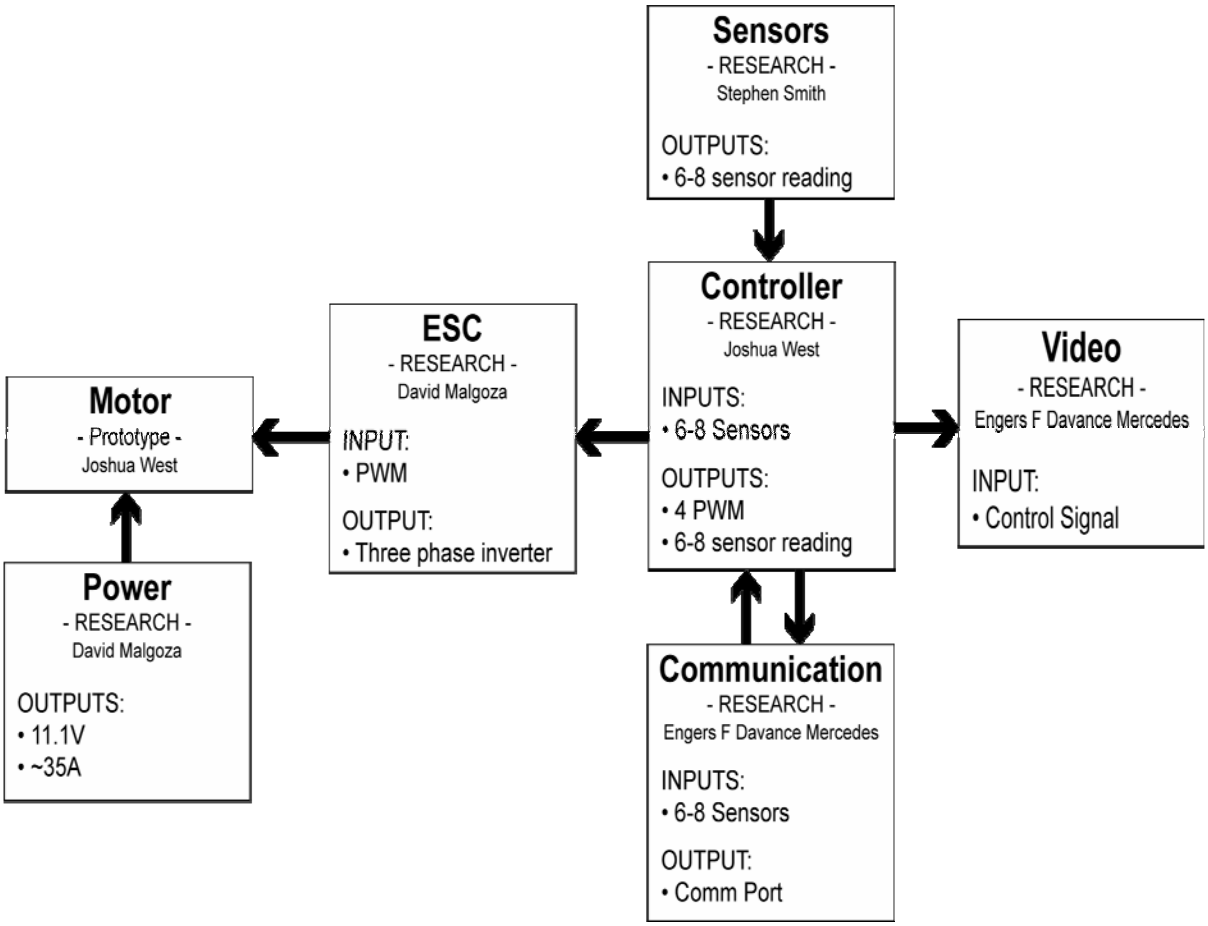
EEL 4914
Senior Design 1
Summer 2010

Our plan is to build a minimal cost quad-copter with both surveillance and autonomous capabilities. The quad-copter will be designed to be as lightweight as possible in order to maximize its flight duration. We intend for the quad-copter to carry a video camera which will either stream video back to the controller in real time or record video for later analysis. We hope to achieve a high level of technical complexity in our design by outfitting the copter with a robust sensor suite including: a gyroscope for stability, integrated GPS system for autonomous movement, sonar and or sharp IR for object avoidance, possibly a barometric altimeter for addition altitude control, and possibly an accelerometer pending more research. The quad-copter will be controlled either directly, with an RF module or autonomously, by way of a programmed GPS location. A significant component of the quad-copter will be the AI programming that processes the various sensor signals into a coherent whole.

The motivations behind the quad-copter are primarily that it has applications in surveillance and emergency rescue however, perhaps more importantly, the quad-copter will represent an engineering challenge to our senior design group.

A goal not to be overlooked is that we must get the quad-copter to hover in a stable and controlled manner. All the systems will depend on this capability. Because we feel that we need to achieve this crucial step early in the development process, we have decided to push the building phase forward to the late summer.




Sensors
- RESEARCH -
Stephen Smith
OUTPUTS:
• 6-8 sensor reading
Controller
- RESEARCH -
Joshua West
INPUTS:
• 6-8 Sensors
OUTPUTS:
• 4 PWM
• 6-8 sensor reading
ESC
- RESEARCH -
David Malgoza
INPUT:
• PWM
OUTPUT:
• Three phase inverter
Motor
- Prototype -
Joshua West
Power
- RESEARCH -
David Malgoza
OUTPUTS:
• 11.1V
• ~35A
Video
- RESEARCH -
Engers F Davance Mercedes
INPUT:
• Control Signal
Communication
- RESEARCH -
Engers F Davance Mercedes
INPUTS:
• 6-8 Sensors
OUTPUT:
• Comm Port