

To Investigate the Development of a Ground Based UAV Testing Platform

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Abstract:

An unmanned aerial vehicle (UAV) is an aircraft without an onboard pilot. UAVs can be remote controlled or fly autonomously based on pre-programmed flight plans or more complex dynamic automation systems. UAVs have many existing applications including: remote surveillance, crop dusting, and weapons delivery. Flight-testing a UAV control system is risky. A ground based test platform would allow the testing and refinement of various systems while removing the risk factor.

The systems in a UAV include: GPS, accelerometers, wireless video, wireless data, radar, and computers. GPS can provide real world position, waypoint navigation, bearing, and speed information. A three-axis accelerometer can measure the UAV roll, pitch, and yaw and provide stability from disturbances. The wireless video and data systems are required for the user and the control systems.

The data from the accelerometers will be fed into a PID loop for axis control. The set point to the PID control will be provided by a microprocessor. The microprocessor uses GPS position data and pre-programmed way points to calculate a bearing error that proportionally controls the bank angle.

Biography:

A Montana native, I earned my Associate Degree at UM in Missoula. I decided to continue my education and transferred to Montana Tech in 2003. I am currently a senior majoring in Electrical Engineering and will complete my Bachelors in the Fall of 2007.

Since the summer of 2007, I have worked for a local Montana Company, IAC, located in Three Forks. IAC performs work in the fields of integration, controls, and instrumentation. Currently, I am helping design an instrumentation system for a CNC water jet. The opportunity to work on the Water jet project was provided by Montana Tech and the Rocky Mountain Agile Virtual Enterprises Technical Development Center (RAVE TDC). My research project is closely related to the work done in the fields of control and instrumentation and combines my engineering knowledge with a real world work experience.

My hobbies include painting, writing music, snowboarding, wakeboarding, robotics, and flying RC or full-size airplanes. Currently I am the RC Flight Instructor of Montana Tech's UAV club. My engineering goals are to work in the fields of: research, controls, robotics, and semiconductor design. I enjoy learning and using my knowledge to make my ideas into realities.