

Single Axis Stability Autonomous Glider Control

Study Conducted by:

Brian Study
studyb@my.erau.edu

Major:

Aerospace Engineering, College of Engineering

Advisor:

Dr. Kenneth Bordignon

Abstract

To investigate and increase knowledge on autonomous control systems, an autonomous glider was fitted with a control system with the purpose of creating a craft that would be capable of maintaining a wings level condition despite perturbations to the trim condition. The glider measures bank angle and roll rate information from an accelerometer and gyro, before it relays the data to an equipped microcontroller. Programmed on the microcontroller is a control law to take the input from the sensors and issue a command to a single servo that controls both ailerons, allowing for the vehicle to autonomously correct its bank angle. The glider has proven to recover up to 15° in a relatively straight path. Although at higher initial bank angles the system is able to correct, the path is less straight as the small angle approximations and other assumptions become less accurate, leading to a greater amount of lateral drift. Corrections can be made to implement a fix by increasing the gain of the system, but in doing so presents structural issues in the current model.