Abstract

STUDSAT-2 is a STUDent SATellite program that aims to build Twin Nanosatellites each weighing approximately 10 kg to demonstrate InterSatellite Communication to improve temporal resolution for remote sensing applications. This paper focuses on attitude determination (ADCS) for small satellites. The method described uses a magnetometer to resolve the three-axis attitude of the satellite. The primary challenge is that magnetometers only instantaneously resolve two axes of a satellite's attitude. Typically, magnetometers are used in conjunction with other sensors to resolve all three axes. In our project, we are using the STM32F407G discovery board controller with a magnetometer and GPS to monitor the change in the attitude of the satellite, and actuator coils to reduce the tumbling rate. By using the IGRF/ECER, model as a reference for the standard magnetometer values. The principle of the Kalman Filter algorithm is used to predict the position of the satellite by taking the inputs from the magnetometer and GPS.
References


Index Terms

Computer Science Communications

Keywords

STUDSAT-2, Attitude Determination and Control system (ADCS), Kalman Filter, Sensors.