Matthew Handley: Electrical & Computer Engineering
Mentor: Dave Klumpar, Ehson Mosleh -- Space Science & Engineering Laboratory
Using Solar Panel Data to Model In-Orbit Spacecraft Dynamics

The goal of this project is to develop an algorithm to determine the orientation and rate of rotation of the Hiscock Radiation Belt Explorer (HRBE), a CubeSat satellite which has been operating in-orbit since October 2011. It was designed and built on campus at Montana State University (MSU) by students of the Space Science and Engineering Laboratory (SSEL). The algorithm uses solar panel electrical current readings to determine the orientation of the satellite. This data will be used by the SSEL to assess the effectiveness of the satellite's passive attitude control system and aid in the development of attitude control systems for future satellites. Additionally, the data will be rendered graphically to accurately represent the orientation and rotation of HRBE over time. This presentation will cover the steps taken to develop this algorithm, as well as its implementation in the data processing routine. Animations of the satellite's orientation over time will also be on display.