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Host Organization: High Altitude Observatory
Title: Developing Embedded Control of CubeSat-Based Instrumentation

A satellite on-board computer (OBC) is an embedded controller that communicates with other satellite components to carry out necessary tasks. For instance, an OBC typically coordinates environmental data acquisition and storage, attitude determination and control, thermal control, and communications with the ground station. The Distributed Irradiance Monitoring System (DIMS) is an instrument to measure total solar irradiance (TSI) from a high-altitude balloon flight, as a proof-of-concept for a future satellite mission. Cube-shaped nanosatellites, called CubeSats, provide a viable solution for low-cost, continuous TSI monitoring because they are smaller and more affordable than traditional satellites. This project implements basic control tasks using the DIMS CubeSat on-board computer. These tasks include data acquisition from accelerometer and magnetometer sensors, file read/write commands for data storage, OBC configuration from the command terminal, and preparation to communicate with external sensors via SPI or I^2C communication protocols. These tasks form the groundwork for future development of embedded control tasks for CubeSat missions at the High Altitude Observatory.