University of North Dakota Advanced Rocketry Club

Avionics Team

Preliminary Design Review



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# Overall System Architecture

Our avionics system will be a low-budget, yet capable and safe platform. Since our exposure to harsh environment time is very short, we can reasonably deploy commercial off-the-shelf (COTS) hardware at a very low cost and low weight. For example, the Raspberry Pi (RPi) and BeagleBone Enhanced (BBE) single-board computers (SBCs) are both about the size of a credit card and weigh less than a typical smartphone. Both are fully featured Linux computers, and the BBE boasts a gigahertz processor with 2 embedded programmable real-time units (PRUs) along with an onboard barometer and 6-axis accelerometer.

Our responsibilities include active management of the engine and it’s systems, data acquisition, telemetry, abort systems, and recovery device deployment. Our rocket will not be using any form of guidance, navigation, and control (GNC) systems due to competition restrictions. We will achieve each of these requirements with appropriate hardware as described in upcoming sections.

# Electronics and Altitude Monitoring

While we’re still in the research phase of our design, we have several options being considered for data acquisition. The obvious solution, the global positioning system (GPS), has some not-so-obvious problems due to U.S. export regulations, specifically CoCom (Coordinating Committee for Multilateral Export Controls), a program that restricts GPS output to below 1000 knots and 18,000 meters.