ARIES-GPS Payload

Inter-American University of Puerto Rico Bayamon Campus

February 2012 monthly report

I. Activities of the team members

During February the ARIES-GPS-Payload members worked on addressing the comments did for the HASP people. In addition the teams worked in other activities that will be describe.

Electronic system

o The dc to dc converter is the priority for the electrical system now. Our goal is to develop the buck converter from scratch with a minimum efficiency of 90% and considerable dimensions. During the last month a couple of circuits have been studied and used to do experiments that lead us to understand the converter. If the converter can't be develop in a time soon, then we're going to proceed and buy the converter from a company. This is our last choice, because we hope to develop the converter in a short time and acquire that knowledge. The next month (March) we're going to know if the converter is going to be developed or bought.

Software

o During the last month the work was headed to select the board to control the Novatel GPS, after a long research and analysis of the mission requirements and objectives the team determined to use the dspic33fj256gp710 microcontroller to manage the functioning of the OEMV GPS receiver. This decision is supported on the fact that most of the calculation to determine radio occultation will be performed at a ground based. This mean that our main goal during the flight is only stored the data from the GPS. Also another important fact is the already experience achieved by some team members in the programming of the previously mentioned microcontroller. In addition during the last month we continue reading the manuals and firmware of Novatel GPS receiver in order to start the creation of the code for project.

Mechanical

o In the February month we did some modifications to the ARIES GPS payload CAD design to reduce its weight. Also we developed the 10g vertical stress analysis and the 5g horizontal stress analysis to the payload modification design. We still need to make some adjustments to the design to decrease the payload weight even more and achieve a stronger payload and then we can start the manufacturing process.

System Engineer

During the last month we integrate to the project a system engineer process. This consist in create a web site where each member can access to the information about the ARIES SAT project. Also the web site will be use as "bulletin board" so that each team member will use it as a journal to identify and keep up with their weekly tasks. In addition this web site allow to the principal investigator, team leader and project manager have access to these documents at any time and in remote location, which allow a precise supervision of the work done.

II. Issues Encountered During Payload Design

o Using the microcontroller to run the GPS implies that we have to design and build an adapter board for the Novatel GPS receiver.

o The COMMANDS and LOGS of the receiver must be carefully managed by our team, since OEMV-1DF is a multiple function device with complex modes of operations. The GPS can be configured like ground base receiver or rover station receiver. The ground base receiver is for operation that requires fixed position and the rover station is for moving application. This means if you use a ground command for the rover station application a syntax error will not generated by the GPS status flag. However this action will compromise the GPS proper functionality.

III. Milestones Achieved

At the time of the projects this are the milestone that we have achieved.

o Reduse the payload weight

o Establish a system engineer

o Define the payload MCU.

IV. Current Team Members and Leaders