

ARIES-GPS Payload
Inter-American University of Puerto Rico Bayamon Campus
April 2012 monthly report

I. Activities of the team members

We will describe the activities that the members of the ARIES-GPS Payload are working at this point of the project.

Electronic system

- Recently there were some changes in the voltage required by the CASES GPS. Now it needs 12V to operate instead of the 5V that we preliminary though. For that reason we started to create a configuration that converts the 30 V from HASP to 12 V for the CASES GPS. Since we have a DC/DC converter model, that is used to converts the 30 V provide by HASP to 5V for the components that require it. Now we want to use the same model for the 30V/12V conversion by changing some external components in the original configuration of the 30V/5V that we already test. After completing this, we just add this configuration to the Eagle schematic of the Power Board to complete the design.

Software

- We did research on real time application interface (RTAI) and Linux kernel for our flight computer. The stock Linux-Arm kernel running on BusyBox supply us the needed tools for our project. But as issues appear during project time modification will be added to the kernel. In addition we did some test on the stock SD card socket onboard and on the ext2 partition. We had to create an initialization script so that TS-7260 recognizes the SD card “fat” format as an “automatic” mount-sector. Also we put to work the Texas Instruments TMP124 embedded on TS-7260 board. It’s a 1.5 degree C accurate programmable digital temperature sensor. Moreover we added “crond” scripts for “cron” jobs but we still found some issues every time system reboot. At the moment we are searching and creating codes example for using input/output (I/O) by pc/104. The team will use it to test the communicating on onboard pc/104 ports with the board running GPS. Furthermore we start configuring the MBS-GPS board which contains the OEMV-1DF GPS receiver. The pc/104 board needs to be configured into the single board computer (SBC) in order to work properly. Right now a low-level configuration is being performed since the TS-Linux kernel of our board lacks the driver software for the industry standard architecture (ISA) bus. As part of the operation interrupt request (IRQ), IO address and port name are being set. In addition the GPIO have been configured for interface the digital temperature sensor.

Mechanical

- In the month of April we got the final prototype of the design done in solid works for the HASP 2012. Made a detailed version of the MBS-GPS-OEMV -1DF PC/104PC and made a detailed version of the Flight Computer TS-7260. In addition we did some

adjustments on how everything is going to be attaching to the structure because we made some changes in the arrangements of the electronics boards. Moreover some parts have arrived at the laboratory and we have started to work on a simple mock-up of the structure so we can get the real one done very quickly and without any problems.

System Engineer

- During this month we worked mainly in review the documentation for the preliminary PSIP. For this team is indispensable that our documents meet the HASP requirements. In addition we spend some time figuring out the necessary inclination angle for our GPS antenna, to be able of perform the radio occultation.

II. Issues Encountered During Payload Design

- To be able of perform radio occultation the GPS antenna has to be incline as some angle. This angle is necessary because, in the radio occultation the GPS receiver track GPS satellite located up to -5 degrees below horizon.

III. Milestones Achieved

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

- Payload running with only 80% of the total current supplied by HASP platform.
- Payload weight close to 80% of the weigh allow for small payload.
- Cross compiling to execute the application on board TS-7260.

IV. Current Team Members and Leaders

