Scarlet Hawk - III

Status Report: April 2015

5/29/2015

Summary of Progress

As the summer semester started, we had to re-organized working schedules. The lack of full time classes gave us more time for the project, spending more hours in the payload. On the other hands, there were several students who had to abandoned the HASP team (in the demographics, you can see the number of people significantly reduced).

Regarding the work itself, the last month we were focused on finishing the structure and the physical design of the payload. Apart from the structure itself, every team also dedicated some time to design where and how to allocate every board and component.

As for now, we have the full structure finished. The aluminum structure is attached to the base-plate, and the FRP fastened to the structure. All parts are potentially removable, thought ideally we will be taking out only two faces of the payload when handling the electronics.

Furthermore, we have designed the electronic boards and configured most of the communication ones. Shortly, we start with test and integration. First, we will be soldering the components to the boards, then connect all boards and finally securing them to the structure.

Milestones achieved

- Main Aluminum Frame Building
- Sensors and Camera Management
- FPGA board design
- Antenna built
- FRP Shields Building
- Transceiver board design
- Serial port encoding: downlink and uplink - HW/SW System

Upcoming Deadlines

- PCB Board manufacturing - HW/SW System
- Integration and testing:
    - Communication data encoder and communication transmitter integration and testing
    - Transmission/Reception testing
    - Final code

Structure of the the teams

Name	Ethnic/Race	Mayor	Grad/Undrgrad	Team	Position	Starting Date	End date
Caterina Lazaro	White	Computer E	Grad	-	Project mangr	Aug-14	On going
Adam Bass	White	Aerospace E	Undergrad	Structure	Team Lead	9/1/2014	Ongoing
Alan Grossmann	White	Mechanical E	Undergrad	Structure	Design coord.	9/1/2014	ongoing

Javier Garcia Gonzalez	White	Electrical E	Grad	Communication	Team Lead	9/1/2014	Ongoing
Jaijo Chalissery	Asian	Electrical E	Grad	Communication	Member	10/1/2014	Ongoing

Victor Arribas	White	Electrical E	Grad	Electronic	Team Leader		
Adnan Baleh	White	Electrical E	Grad	Electronic	Member	9/1/2014	

Structure

After cutting all shelves aluminum angles, all that was left was fastening them. The pieces are attached with screws and nuts, providing a strong, robust frame which, at the same time, is detachable. Same philosophy is used to fix it to the base-plate.

The next step was the FRP shield building. We got the measurement and then cut 5 pieces of FRP (4 lateral sides, and a top cover). In order to have an easy-access, isolated enclosure for our electronics, the FRP pieces are individually attached to the structure (also with screws). We have built the shield so that, in general, only two lateral sides need to be disassemble every time. Moreover, these two sides are the ones where the antennas will be.

Now, we will be helping communication and HW/SW team with the last FRP modification. Depending on sensors and antennas specification, the FRP needs specific holes to be made.

Communication

We have refined the FPGA program. We are able to provide a coded output with a continuous bit sequence at the input. Some other modules have been programmed so they will be integrated with the original structure, so we will be able to change our configuration to test different communication system.

All hardware required has already been received and the mounting of the boards is right now in progress, taking into account the results from Structure team. Furthermore, we have planned the antennas attachment to the FRP, making sure they could stay fixed and perpendicular to the payload's correspondent face as well as they are removable (in case they are damaged and need replacement). Considering the different antenna designs, we will be using their ground plane to secure them into their right position.

HW/SW System

We have been working mostly on building the PCBs. We will be using three different boards, and we already have the design of the circuits and the layout.

Since we will be manufacturing our own boards, we have done a first trial in the university's facility (the Ideashop) to familiarize ourselves with the process, and test the software we are using to design the PCB models. Out of the PCBs, we have been working on the whole code that we already got. We included the serial communication part: sending the sensors data and having the Arduino ready to receive and react to commands.