ILLINOIS INSTITUTE OF TECHNOLOGY

Scarlet Hawk - III

Status Report: February 2015

2/27/2015

Summary of Progress

In February, all teams started with the payload implementation itself. There are weekly working sessions, where each milestone is usually divided into smaller task to work individually or by pairs.

This year's beginning has been a bit slow, and some of the deadlines has been postponed. Nevertheless, this delay has been caused by a deeper study of the technical communication experiment (in particular, the FPGA implementation) and the structure implementation. We expect this preparation will avoid future problems and issues in the payload.

As a result of this first approach to the project and its work, we have made some other changes in the schedule of this year. Firstly, the communication team decided to move the antenna development earlier in the calendar, since it might require more testing and measures (it can be seen in the upcoming deadlines, that the next milestone is the antenna). Moreover, the structure team is considering using the Spring break time (March 13th to March 20th) to accelerate the process and prepare the payload frame.

We are also contacting the professor in charge of one wireless communication lab in the Electrical and Computer Engineering department. We hope we can partner with them and make use of their laboratory equipment to perform our antenna testings. Also, there is the chance of getting some

Milestones Achieved

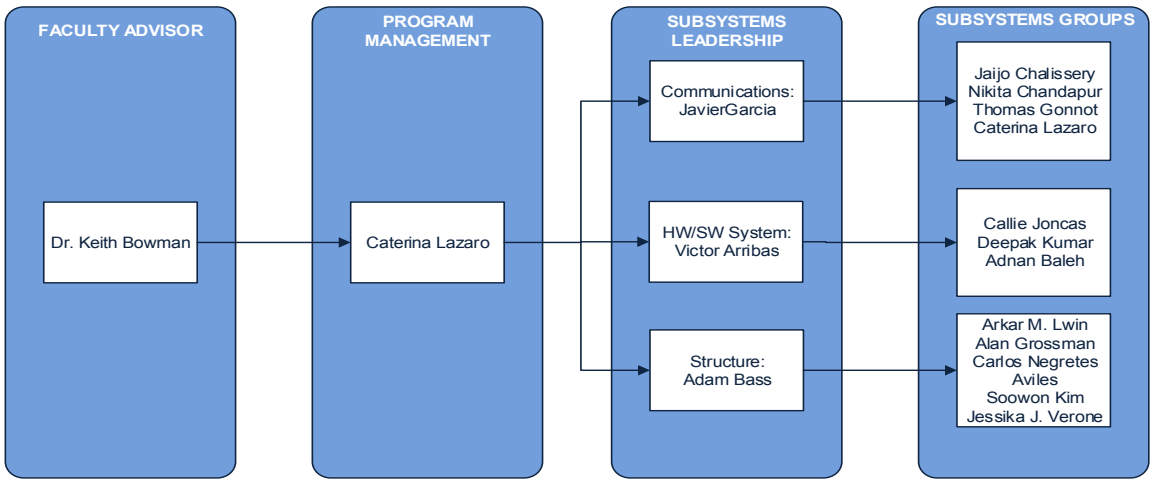
- Sensors and camera management - HW/SW System

Upcoming Deadlines

- FPGA design and Antenna (March 20th)- Communication
- FRP Shields Building (March 7th) - Structure
- PCB board design and building (March 27th) - HW/SW System

Structure of the the teams

Same members



Structure

Since our last update, our method of connecting the extruded brackets has gone back to screws—specifically 8-32, 3/8" aluminum round head screws. This should provide enough clearance while still holding tightly and offering easier removal if necessary. We're currently still waiting on the materials from McMaster-Carr. See below for a list of materials on order:

Material	Count
6061 aluminum angle legs	16'
6061 aluminum 1/16" sheet	1'x3'
10-32, aluminum hex nuts	100
10-32 aluminum head cap screw	10
8-32, aluminum hex nuts	100
8-32, 3/8" round head aluminum screws	50

Given our time constraints, we've procured a 3rd party willing to cut the aluminum sheets to specifications. This should give us time to focus on cutting and connecting the extruded legs. As mentioned in the recent proposal draft, we will now be attaching the base plate to the structure using aluminum hex nuts and screws. Note that shoe can be found in the above table. We have ample leftover FRP and ordered additional aluminum sheeting in case the sheet we have isn't enough. We're looking forward to actually getting our hands dirty.

Communication

In this last month the Communication team has been working on both the FPGA and the Antenna parts.

For the FPGA, we have been defining the block diagram of our primary communication system, the one using OFDM + QPSK, defining also the coding involved before that. We have also started to define the diagram for an IFFT module at a gate level, so we can start to implement it using Verilog or VHDL. On the other hand, one of our teammates have been doing some research in programming an FPGA using Matlab or using a state diagram.

For the Antenna part, some of our teammates have been doing some research about building a monopole antenna and have been finding the necessary parts to start building one and perform some initial tests. We are trying to request access to one of our laboratories to start doing some communication tests at low power. Apart from all of these tasks, we have been searching on the internet the necessary components on the communication part, all the boards needed such as FPGA, ADC converter, RF amplifiers, etc. We are expecting to have all the components in the following weeks.

HW/SW System

This month we have finished testing camera and pressure sensors; it is missing only light sensor. We are working on it at this moment. We already got all the programs and started to merge all of them in one only program as well as the final circuit is also started.

About serial communication we have gathered all the commands and started coding what will do the communication

encoding.

Next week we will be having a longer session in order to put altogether in order to finish it before spring-break.