Note to Semi-Finalists

Thank you very much for participating in the HUNCH Design and Prototyping. This was by far the most difficult year for deciding finalists. Part of the difficulty was the number of teams participating but the most important part was the number of high quality of prototypes for each of the 10 projects.

Each Mentor helped choose potential finalists for their area and were then compared with the same type of projects across the country. Teams that were selected to be finalists had very tough competition and it was very difficult to down select. Although everyone wants to be a finalist it isn't possible and decisions have to be made. Some of the decisions include the requirements but also trying to show diversity of how the problem could be solved. There was no shortage of good and diverse ideas.

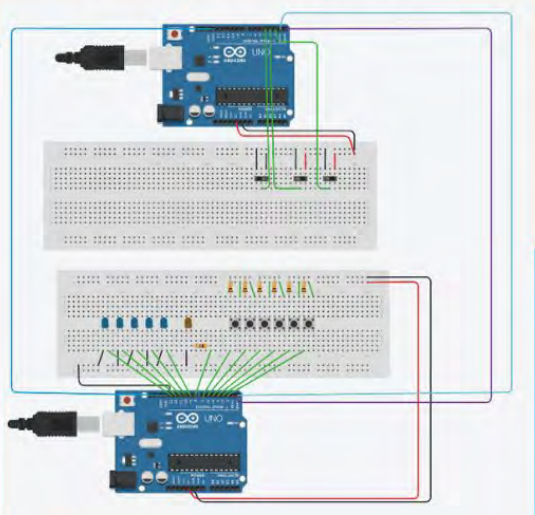
Being a Semi-Finalist is a great honor because each of you put together a project and data that made the teams think, learn and be excited about space. Your great ideas and hard work is what makes NASA HUNCH a challenge and a great experience for engineering. We hope you enjoyed the projects as much as we all enjoyed seeing your prototypes.

If you are a senior and moving on to college, industry, or trade schools, make sure you include your project with NASA HUNCH on your resume. You will find that your interview will center on "what did you do for NASA?" The more you tell them, the more they will want to hear. You will be receiving a letter of recommendation from NASA HUNCH describing Design and Prototype and the project you worked on. We hope that your work will translate to opening doors for your future. Thank you for being in the NASA HUNCH Design and Prototype Program.

WELCOME TO

KWADROPUS-CONTROLS

SCVTHS NASA HUNCH



MEET THE TEAM

COLLABORATORS

MR DAN DALFONZO (TEACHER)

STUDENTS

MERRICK BROGDAN (RESEARCH)
HARSHIL SHAH (SLIDE DESIGNER)
JOSEPH KECK (PROGRAMMER)

ADDRESS:

SOMERSET COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOL
14 VOGT DR, BRIDGEWATER, NJ 08807

WEBSITE:

HTTPS://SITES.GOOGLE.COM/SCVTHS.NET/KWADROPUS-CONTROLS-SCVTHS

OUR JOB

The kind of soft robotics we are working on operate similar to a octopus arm. We are the controls team so we do not have an arm prototype, however we do have programs that run between an arduino and raspberry pi to simulate an arm brain and central brain fror the Kwadropus.

WHAT IS IT?

The Kwadropus is a sophisticated 4-armed Octopi soft robot. It would have 5 brains in total. One is the main/ central brain responsible for keeping the other 4 arm brains in check. 3 arms would be for mobility and 1 would double as a cleaner/duster arm. Each arm could have a magnet for docking It would have inflatable air bags that are used for propulsion gas storage and cushioning.

HOW THE CONTROLS WORK

There is a central brain and an arm brain. The central brain will be an raspberry pi and the arm brain will be an Arduino board. There will be an ultrasonic sensor on the end of the arm which will detect the distance between the surface on the ISS and the robot. The sensor will then record the lowest distance and report back to the arm brain. If the distance is less than 20 inches, the central brain will tell the robot to move to the surface. When the arm is close enough to clamp, an electromagnet will stick to the surface. If it is already on a surface and is floating away, the central brain will detect the distance and when the sensors below are lined up, it will engage the down thrust which will push it back down. Alternatively, electromagnets could be used to eliminate the need for the propulsion system and may be more efficient

ISSUES AND POSSIBLE SOLUTIONS

CONNECTING THE BRAINS
- **USB & SERIAL BYTES**
  - **PROGRAMMING**
- **IF-ELSE STATEMENTS AND CUSTOM IMBEDDED FUNCTIONS**
  - **THIS CONNECTS THE BRAIN INTERFACE**

- **MATERIAL**
  - **DID WE USE SAME OR DIFFERENT MATERIALS WITH THE DESIGNS**
- **CLAMPING MECHANISM**
  - **ELECTROMAGNET**
    - **WHAT IF THERE IS NO MAGNETIC SURFACE TO CLAMP ONTO**
      - **SUCTION CUPS**
  - **CLAW**
- **FLEXIBLE MOVEMENT OF ARM**
  - **TRIANGLES CONNECTED BY 3 WIRES WHICH WOULD BE PULLED BY 3 MOTORS WHICH WOULD BE CONNECTED TO THE ARM BRAIN**