



HASP 2018 Monthly Status Report

Report Month: FEBRUARY 2018
Submitted by: Jimmy Acevedo, Julie Hoover
Submit Date: 02 / 23 / 2018
Institution: The Unacceptable Risks / Durham Tech
Payload Number: 2018-11
Payload Name: Robotic Arm Manipulation and Materials
Matching: RA(M³) or RAM

I) Activities During Previous Month:

- Made a full poseable model of our 2nd arm revision 3D printed to identify strengths and weaknesses of the design, and to use as a discussion tool when debating design decisions.
- Identified need for larger servos after a thorough analysis of the torque required for our mission.
- Built test rigs for long-duration T/V tests of our servos, thermometry, and cameras.
- Purchased several different lightweight cameras to test their power efficiency, performance in vacuum, image quality, ease-of-control, and form factor.
- Started 2nd revision of 'Busy Box'.
- Started design of spring-retracted reel-feed system to tether our only detachable parts securely to the payload.
- Finally decided on a connector family (Molex Nano-Fit wins out over KK-254 and SL-series) for a standard and secure wire-to-board solution for 90% of payload wiring.
- Began working on the I²C communication network.
- Created ROS nodes for Apriltag detection and getting images from the vision cameras (formerly known as the gripper cameras.)
- Settled on initial position and type of Apriltags for Busy Box.
- Continued with fundraising efforts -- Gizmo Brew Works is giving us 25% of profits from this Saturday's happy hour. We'll give duelling presentations with our sister project, NASA Swarmathon.

II) Issues Encountered:

- Delays in our procurement pipeline are slowing development (yet again.) Working to improve throughput.
- Our servo calculations triggered a third major redesign of the arm due to their larger form-factor.
- Due to technical delays, we have not run our systems test in vacuum yet.

III) Milestones Achieved:

- Found a promising camera solution that's much lighter-weight, easier to use, and provides better output than our current candidate. We'll see how it performs in vac.
- [We let our social media lead buy a fun thing for outreach and visibility.](#)

IV) Plans for Coming Month:

- Extend crunch time with additional Saturday workdays (raising total to 7 hours of all-hands group meeting time per week, plus 'homework' tasks) for prototype production.

- Redesign arm to accommodate larger servos.
- Test individual components (cameras, RPi, etc.) in vacuum (and maybe in cryo/bake.)
- Send revised t-shirt design off for printing.

V) Other Comments:

- n/a

VI) Team Composition and Organization:

Name	Start Date	End Date	Role	Student Status	Race	Ethnicity	Gender	Disabled
Jimmy Acevedo	10 Oct 2017	Present	Student Team Lead	Undergrad	White	Hispanic/Latinx	Male	No
Daniel Daugherty	10 Oct 2017	Present	Mechanical Engineering	Undergrad	White	Non-Hispanic/Latinx	Male	No
Daniel R. Koris	10 Oct 2017	Present	Electrical & Software Lead	Undergrad	White	Non-Hispanic/Latinx	Male	No
Munir Sultan	10 Oct 2017	Present	Electrical Engineering Consultant	Undergrad	Asian	Non-Hispanic/Latinx	Male	No
Kieran Valakuzhy	10 Oct 2017	Present	Electrical Engineering Consultant	Undergrad	Asian	Non-Hispanic/Latinx	Male	No
Meredith Murray	10 Oct 2017	Present	Documentation & Social Media	Undergrad	White	Non-Hispanic/Latinx	Female	No
Spencer Boyd	10 Oct 2017	Present	Machinist Consultant	Undergrad	White	Non-Hispanic/Latinx	Male	No
Landon Fernandez	05 Jan 2018	Present	Aerospace Engineering	Undergrad	White	Hispanic/Latinx	Male	No
Soham Pai Kane	15 Dec 2017	Present	Software	Undergrad	Asian	Non-Hispanic/Latinx	Male	No