Final Dust Collection and Environmental Data Storage Testing

Date: 4/22/18
Time: 9-11 am

Primary Purpose: To verify that dust could travel through the nozzle, tube, and flutes to be deposited in the collection chambers.

Secondary Purpose: To verify that the electronics store environmental data to the sd card.

Procedure Overview: Use a pump, rock chalk, and charcoal to simulated blowing dust while the electronics collect and store environmental data.

1. Take “before” pictures of the capsules.
2. Turn on electronics.
3. Assemble and seal the collection box.
4. Set up outside on the patio with the pump sitting 2 ft away and on the same horizontal plane as the nozzle. Make sure air blows directly into the nozzle (it is anti-parallel with the normal of the nozzle).
5. Blow a partial spoonful of rock chalk into flute 1.
6. Manually move the motor over to flute 2.
7. Blow a partial spoonful of charcoal into flute 2.
8. Take “after” pictures of the capsules.

Results:

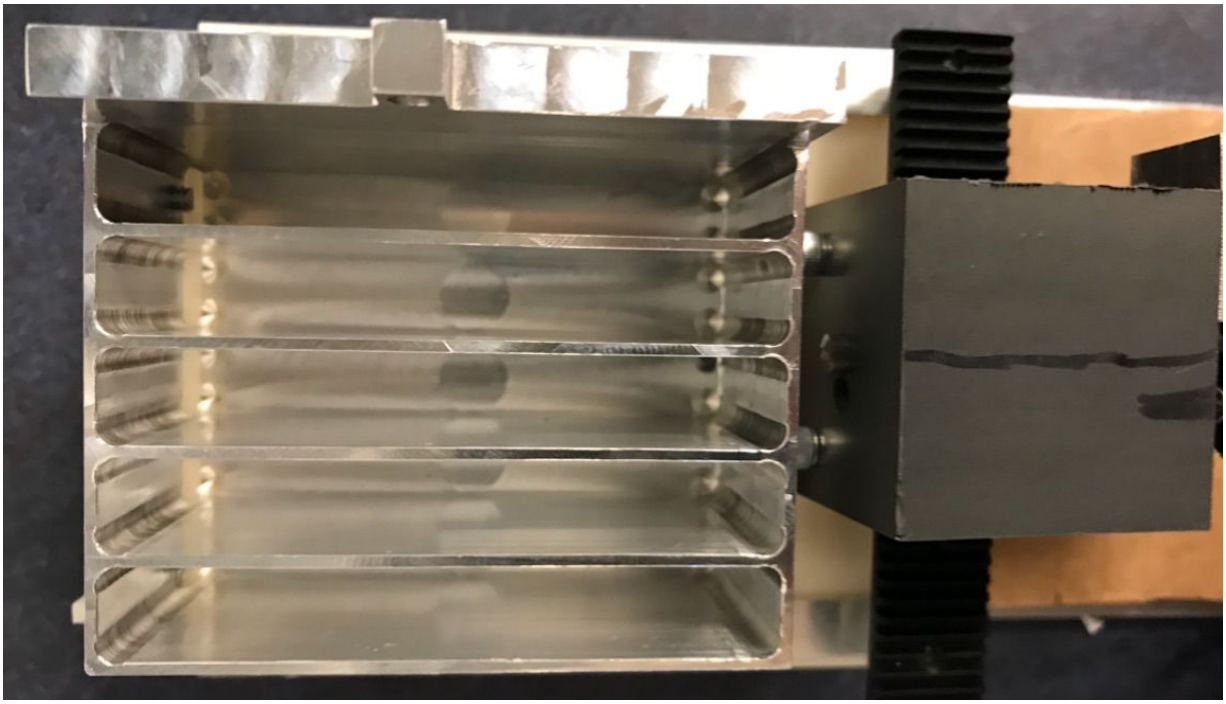
- Pre-test voltage of battery: 4.22 V
- Rock chalk seemed to deposit in the tube and on the flutes. A small amount of rock chalk deposited in the capsules.
- The bigger charcoal chunks were successfully deposited into the capsules. A small amount of charcoal was deposited in the capsules.
- There was some mixing of the rock chalk and charcoal in capsule 2.
- Post-test voltage of battery: 4.22 V
- Duration of battery ON: ~45 minutes
- Data seemed to have stored to the SD card. Still needs to be converted to human-readable form and analyzed.

TO-DO (top priority to lower priority):
Key: **ELECTRONICS** **STRUCTURES** **SYSTEMS** **URGENT/ALL**

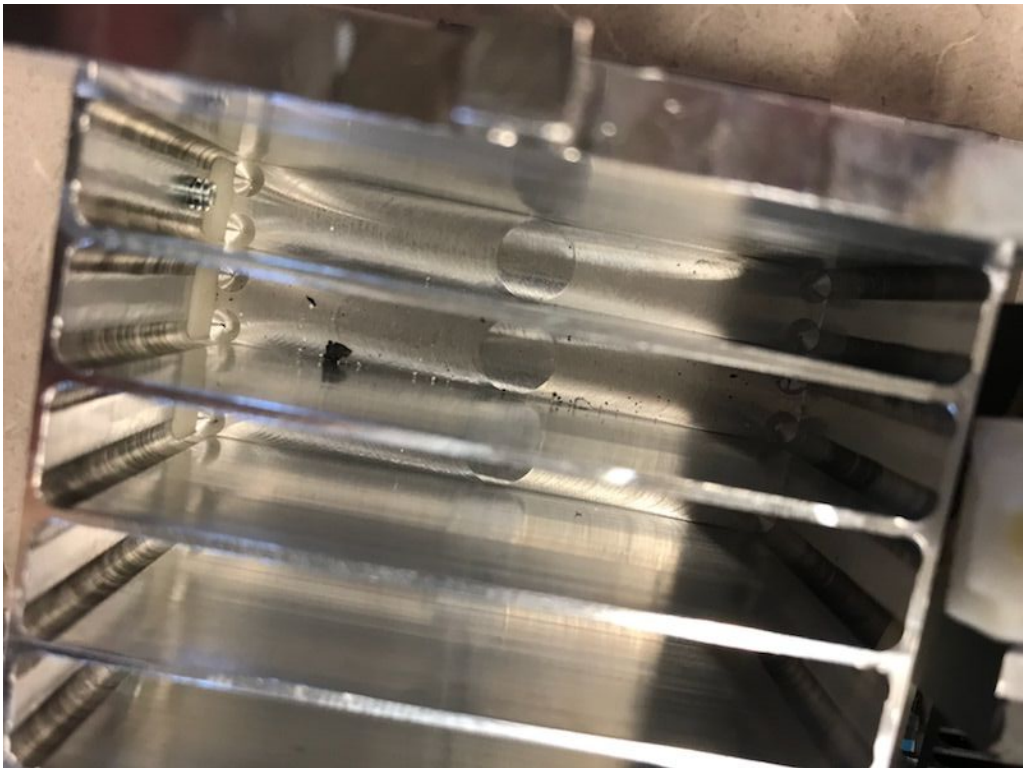
- Motor won’t move - seems to be stripped? @Collin please work with @Owen to figure out this issue. It is our highest priority and needs to be fixed ASAP.

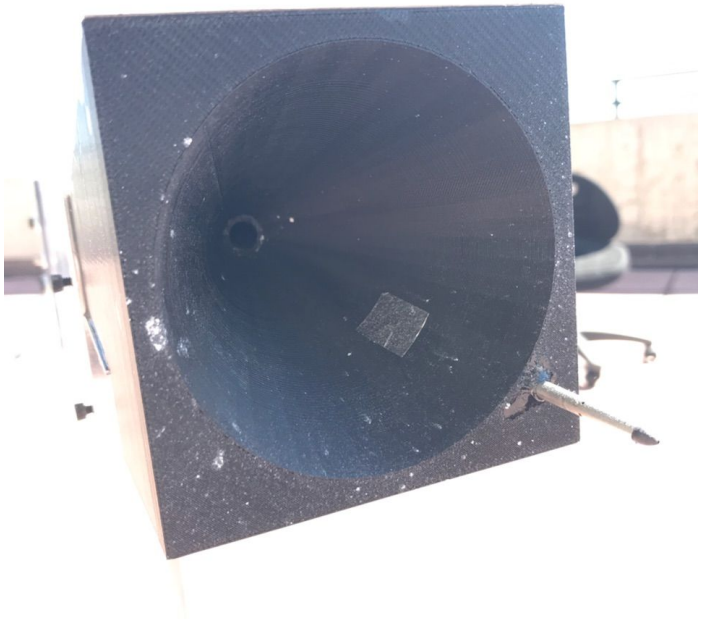
- Need to test motor/limit switch system with the whole innards assembled.
    - Structures needs to figure out why the motor won't move and get with electronics to test the limit switch/motor alignment (Thursday, 4/26/2018)
    - Electronics needs to get with structures to test the limit switch/motor alignment
    - Motor Mount needs to be adjusted so that the motor can move the full length of the rack
    - ~~The limit-switch/motor nub needs to be less wide. It was getting caught on the limit switches and wire attachments. Make sure to secure the nub in a position so that it hits ALL the limit switches~~
- Electronics needs to analyze the SD card data to be human readable.
- Possibly print data to excel rather than .txt
- ~~Structures needs to make sure everything can fit in the system. They also need to start epoxying everything down~~
    - Little tube plastic piece to motor housing (Thursday, 4/26)
    - Shutter things for exhaust holes (Thursday, 4/26)
    - ~~Board with standoffs~~
    - ~~Re-epoxy/tape nozzle~~
- ~~Make sure that the batteries can fit in the box and not interfere with switch / status button / motor~~
- ~~Structures needs to widen the hole for the bearing~~
- Systems needs to do sail alignment testing
    - Will will implement the new bearing system
- Electronics need to finish:
    - Status request with interrupt
    - Replace/fix temp sensor
    - Convert all data to use-able form
    - RTC and sleep modes
- Electronics need to trim wires.
- Electronics needs to connect true power switch, status LED, and status button
- ~~Structures needs to deburr the flutes~~
- ~~Bracket needs to be improved (but be aware that alignment and space is very tricky to manage). Currently have to keep bracket very loose and use far holes for attachment. (Wednesday, 4/25/2018)~~

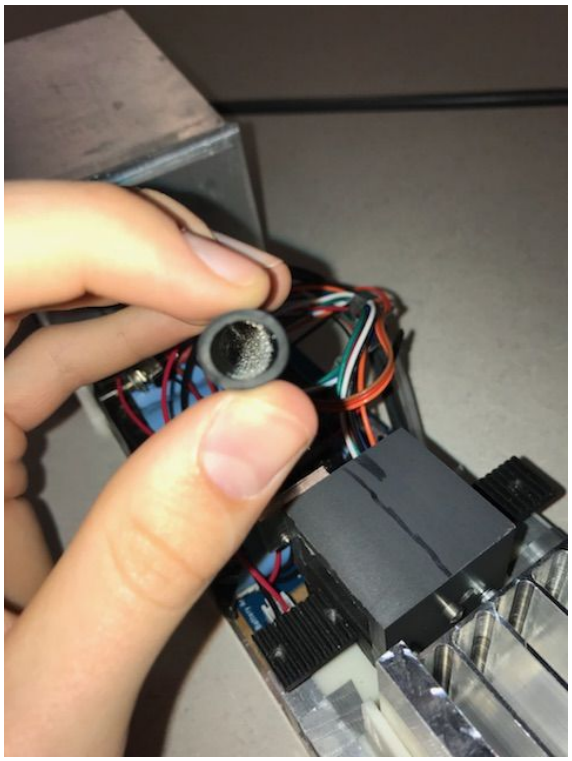
Before Pictures:



After Pictures:







All Pictures + Videos:
https://drive.google.com/open?id=1eJtrtYqswMV5qju-WJM6PVNbG07oQM1F

Test data: https://drive.google.com/open?id=1hp0YnfOP5PI-oI2b9zIy52cJfiFCF2cr

Progress towards full day-in-the-life testing:
https://drive.google.com/open?id=1RqkoLmh4ZqtzyZxHBcHvw24y0mq1nEHp8rrTIXO1lLc