

# UMBC DUSTY PLASMA LAB SOUNDING ROCKET PAYLOAD

Michael Schwab

MDSGC Summer Exchange Program



# ABOUT ME

- School: University of Maryland College Park
- Major: Aerospace Engineering
- Year: Senior Graduating May 2019



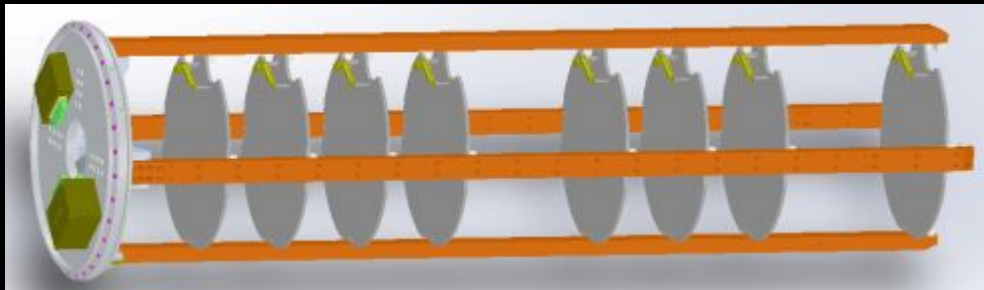
# MISSION

- Build and Test payload to Perform Spectroscopy
- Detect Sodium up to 150km altitude
- Support Theory that Part of Oceans Salinity Comes from Space
- Meteorites, not Breakdown from Rocks on Earth



# PLATFORM

- Rocksat-XN
  - Colorado Space Grant Consortium
  - Terrier Improved Malamute
  - Andoya Space Center Norway
  - Launch January 2019





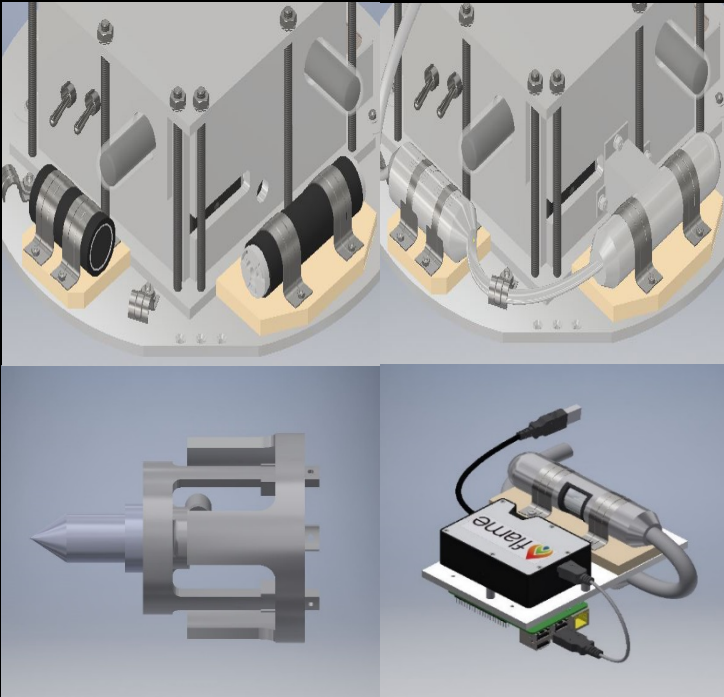
# METHOD

- Using ~40kV+ to cause breakdown
  - Ionized State
  - Batteries+Transformer+Electrodes
- Create a Plasma Where Electrons are Free to Move
  - Create High Temperature
- Wavelengths are Measured
  - Spectroscopy Instrument
- Data Transmitted
  - Rocket Telemetry
  - Iridium Satellites

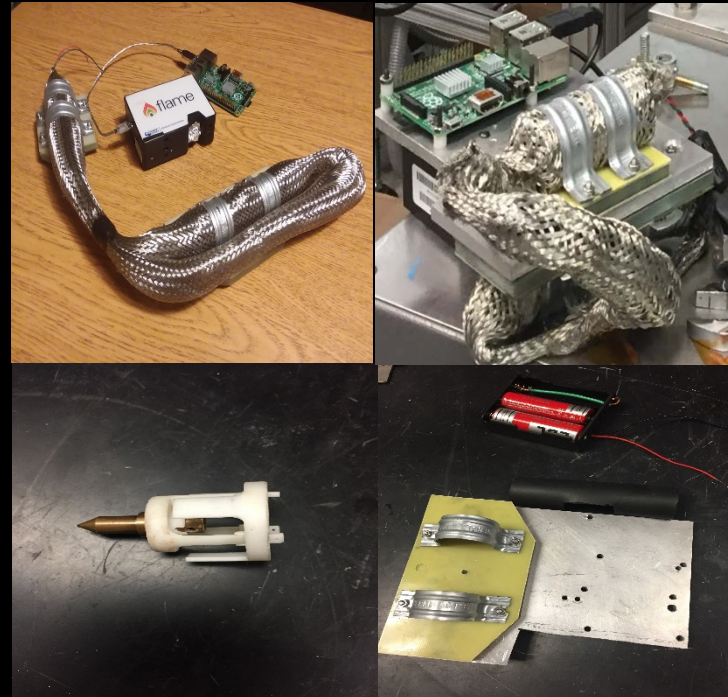


# WHAT I ACCOMPLISHED

## Modeling



## Assembly



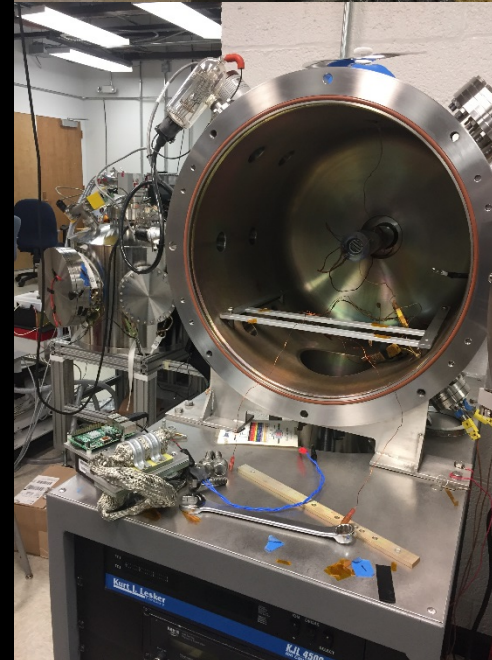
## Testing





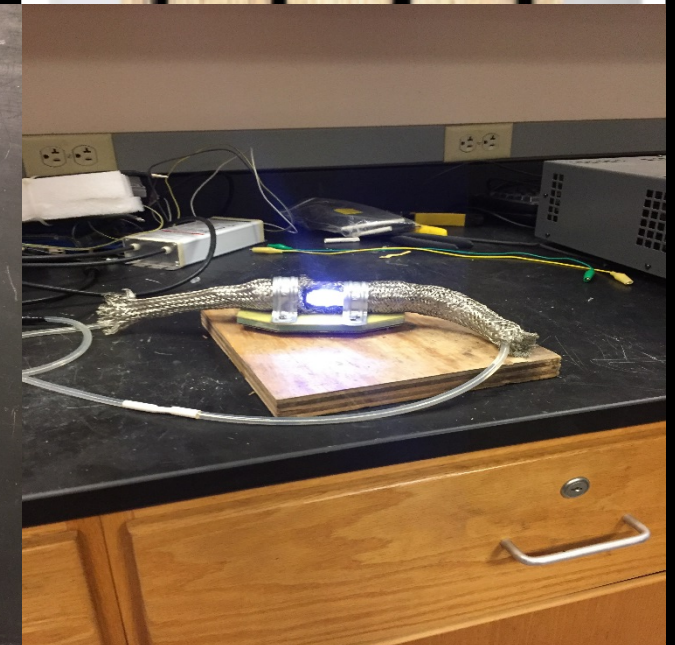
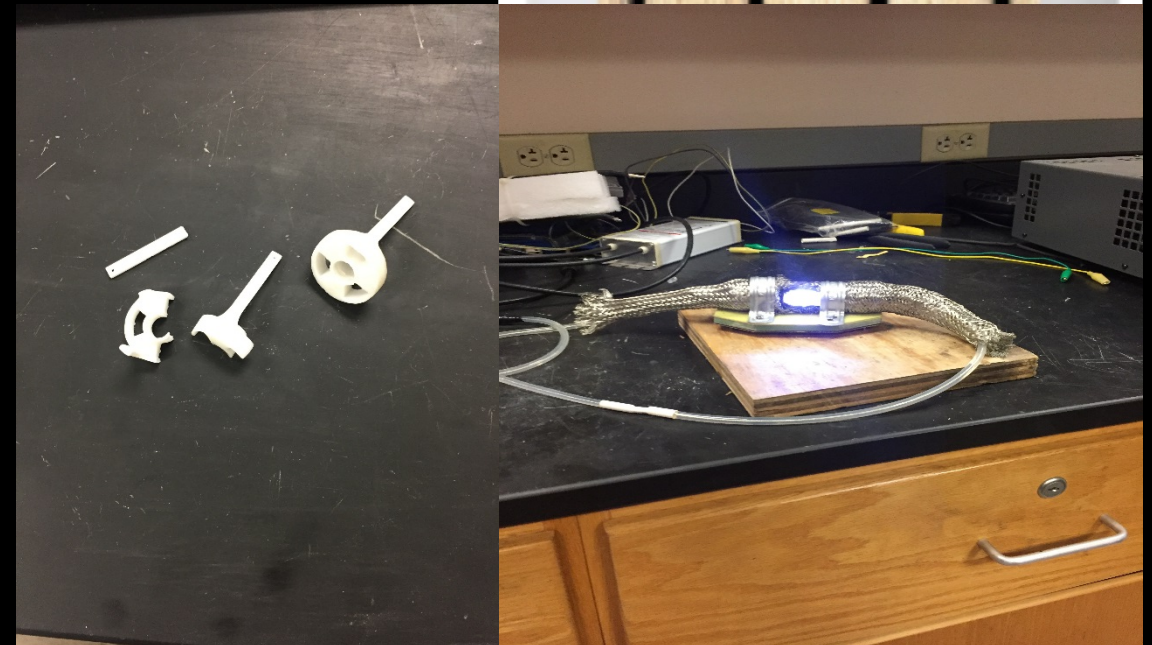
# WHAT I LEARNED

- Experience in the Machine Shop
  - Helped Make Some Parts
- Vacuum Chamber Operation
  - Outgassing
- Inventor
  - Never can Have too Much Detail
- Test as Early as Possible
  - Something Always Fails the First Test
- Once You Have A Plan Act Quickly



# CHALLENGES

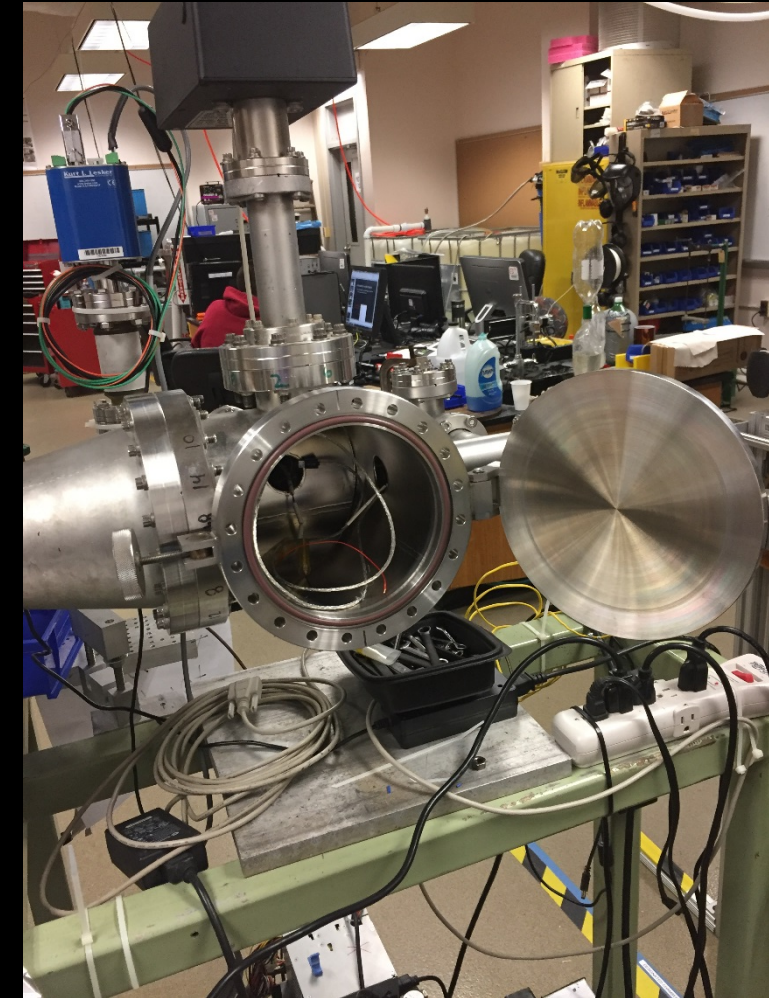
- Being a Good Rocket Neighbor
  - Battery+Transformer+Electrodes= TASER
  - PENN State RF
  - New Hampshire Light
- Vacuum Testing
  - Small Chamber
  - Large Payload
- 3D Printing SLA
  - Multiple Failures
  - Little Pieces Break





# UNFINISHED TASKS

- Assembly Manual
- Additional Testing
  - Vacuum Test for Outgassing background
- Mission Support
  - Provide Guidance on assembly and systems to Norway Team After I Leave



# ACKNOWLEDGMENTS

Thank You

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QUESTIONS