Wepwawet
Critical Design Review

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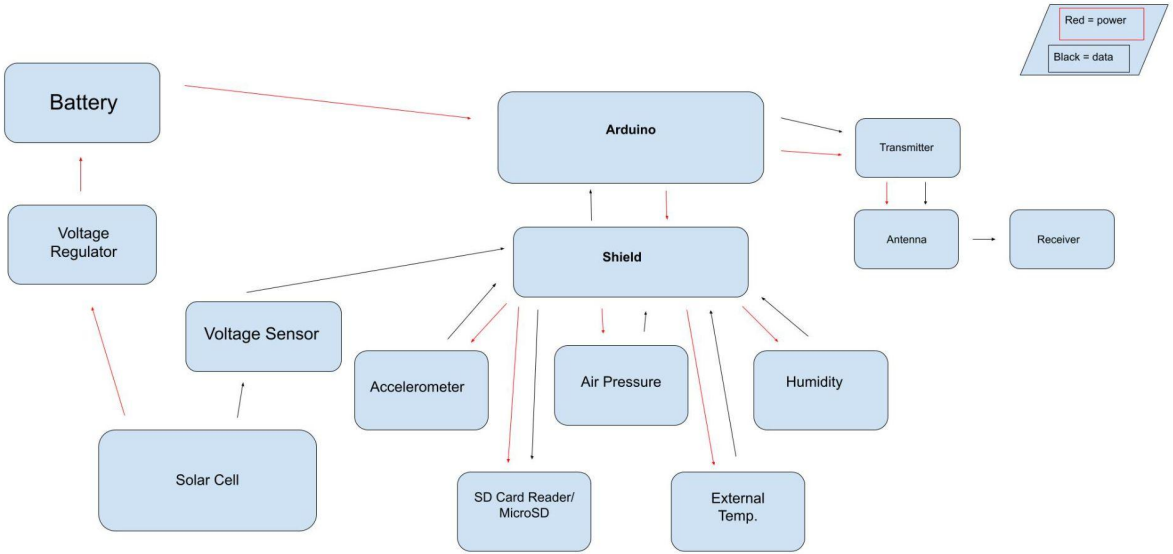
Mission Overview

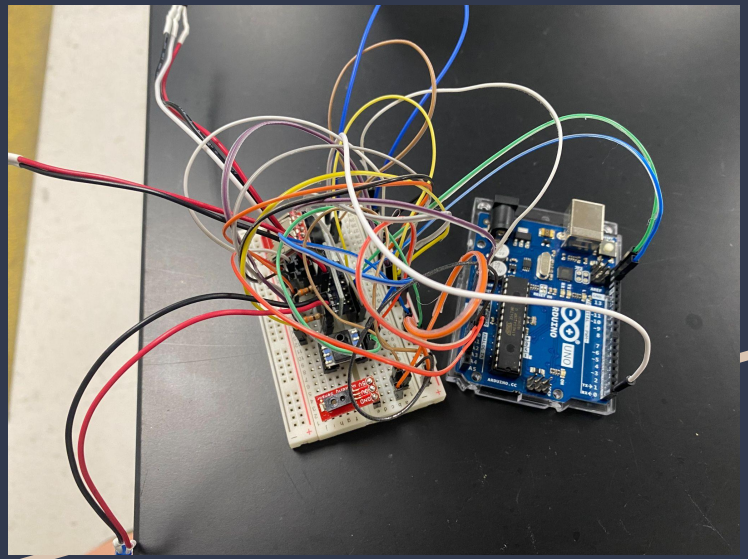
- Create an efficient, cost-effective, sustainable, and reusable solar-powered weather balloon
- Wanting to create effective base product for others to build off
  - Prove to industry there are more sustainable options than current radiosonde network
- Challenges:
  - Is solar enough to power our system for an entire flight?
  - Will our telemetry setup prove to be enough for our balloon chase?

Subsystem Overview

- Changes since PDR
  - Telemetry Parts Approved!
    - (Different Air Antenna)
  - 915 MHz frequency



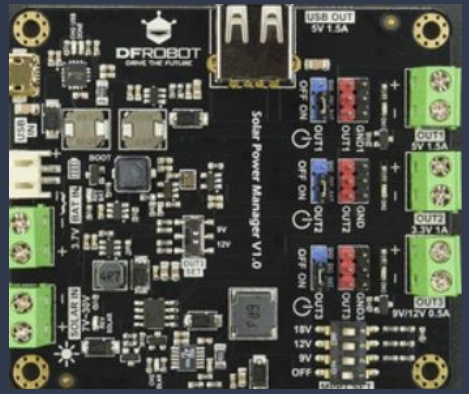
Design



Breadboard Weather Balloon Subsystem

- Solar Subsystem
  - 1-3 solar panels, voltage sensor, voltage regulator, rechargeable battery
- Weather Balloon Subsystem
  - Similar to test build, higher quality sensors
- Telemetry Subsystem
  - 915Hz Arduino compatible radios
- Ideas for build of box
  - Similar build to last box
    - Rectangular base
  - Protection/Wave amplification for antenna
  - Protection/Power amplification for solar panels

Parts Lists



Solar Power Manager

Solar Subsystem	
Part	Reason
3.7V recharg lithium ion batt	Power backup/storage
Solar panels	Power
Solar Power Manager	Buck converter/voltage regulation
Voltage Sensor	Measure actual voltage for solar

Telemetry Subsystem	
Part	Reason
Arduino MKR WAN 1310	Ground&Air Radio
Directional Antenna	Ground station
Omnidirectional Antenna	Air Station

Parts Lists (contd.)

Weather Balloon Subsystem	
Part	Reason
Temp sensors	Weather prediction
Huidity sensor	Weather prediction
Pressure Sensor	Weather prediction
Accelerometer	Weather prediction
SD Card Reader	Data Collection
Micro SD	Data Collection

Box Design	
Part	Reason
Foam Core	Build
Insulation	Insulation
Flight Tube	Stability
Aluminum	Wave amplification

Budget

Part	Pack Cost	Cost/Piece
Arduino Pro Mini	$24.61	$24.61
Voltage Regulator	$5.99	$1.20
Solar Panel Packs	$30.46	$5.07
Accelerometer	$6.49	$6.49
Antenna	$13.99	$4.66
Voltmeters	$5.89	$1.18
Arduino MKR WAN 1300 x2	$95.60	$45.80
Pigtail Connectors	$9.95	$2.50
Antenna for box	$14.00	$7.00
Antenna for ground	$35.09	$35.09
Solar Panel Manager	$38.90	$38.90
Total	$280.97	$172.50

Bought and have
Bought and cannot use
Do not have part yet

Timeline

Date
Timeline
3/01

- Incorporating subsystems
- Build
- Solar panel testing
    - w/ & w/o aluminum foil addition

3/08

- Finalizing build
- Testing radio capabilities
- Box design

3/15

- Finalizing code
- Final box build

3/22 FRR

- Whip test
- Freeze test
- Drop test

3/29

- Time to fix problems

3/30 Flight Day!

Concerns?

- Is solar enough to power our system for an entire flight?
  - Multiple solar panels
  - Backup battery
  - Voltage sensor measuring solar panel output
- Will our telemetry setup prove successful?
  - Testing telemetry capabilities
- Can we build the most effective base product possible?
  - Focus on build
  - Higher quality sensors

Conclusions

- Ready to build and conquer!
  - Go Wepwawets!

HOORAY!