CanSat Leader Training Program (CLTP) - 8th Cycle

Final Presentation

Dr. Ayman H. Kassem

Aerospace Engineering Department, Cairo University, Egypt

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Mission Statement

Estimating Impact-Force of a Re-entry Vehicle For Hazardous Analysis and Structure improving

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Mission success

- 9 axis sensor running and saving measurements to SD+ Temp +volt. **Minimum Success**
- 9 axis sensor running and transmitting measurements to ground station+Temp +volt **Success mission**
- Measuring impact force **Extra-Success**

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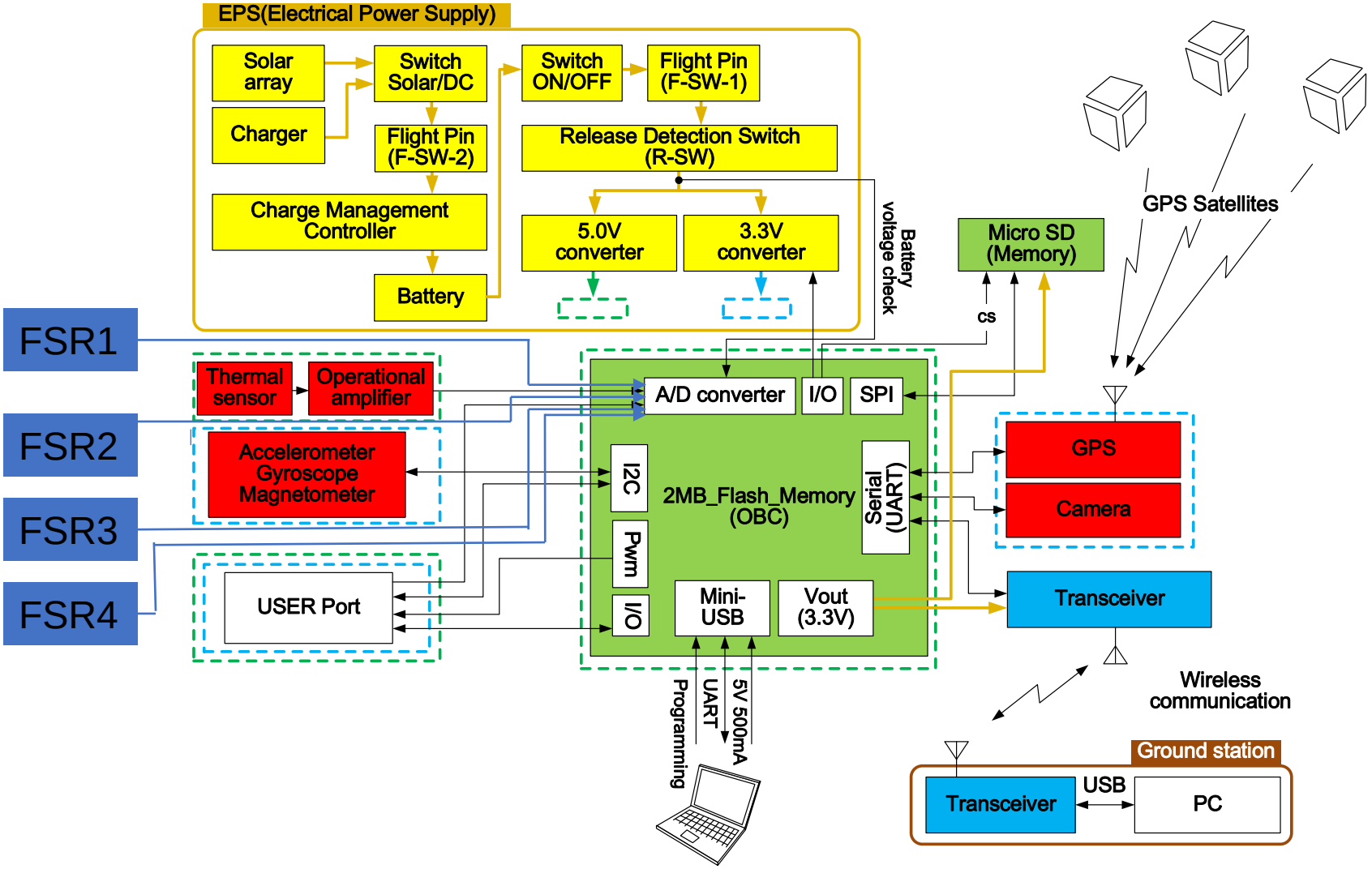
Mission Requirements

No.	Event	Requirement	Required Function	Verification Way
R-1	Preparation Phase	All systems having power	Check leds	All lights on
R-2		Wire are in place	Check wires	All wires are in place
R-3	Standby time phase	Battery Voltage is >4 volt	To charge battery from the external source	Confirm battery is charged using Multi-meter
R-4	Launch Phase	Install satellite on octocopter	Installation	Visual inspection
R-5		Launch	Run the octocopter	
R-6	Mission Phase	Release from octocopter		Visual inspection
R-7		Open parachute	Release command	
R-8		Getting the required data	Receiving data at Ground station	Data shows on Ground station
R-9		Landing	Manual landing of octocopter	Visual inspection
R-10	Analysis Phase	Structure checking and hazardous analysis	Structure analysis for structure and for human head	Results are consistent with scientific findings

ALL OK

Satellite System Architecture



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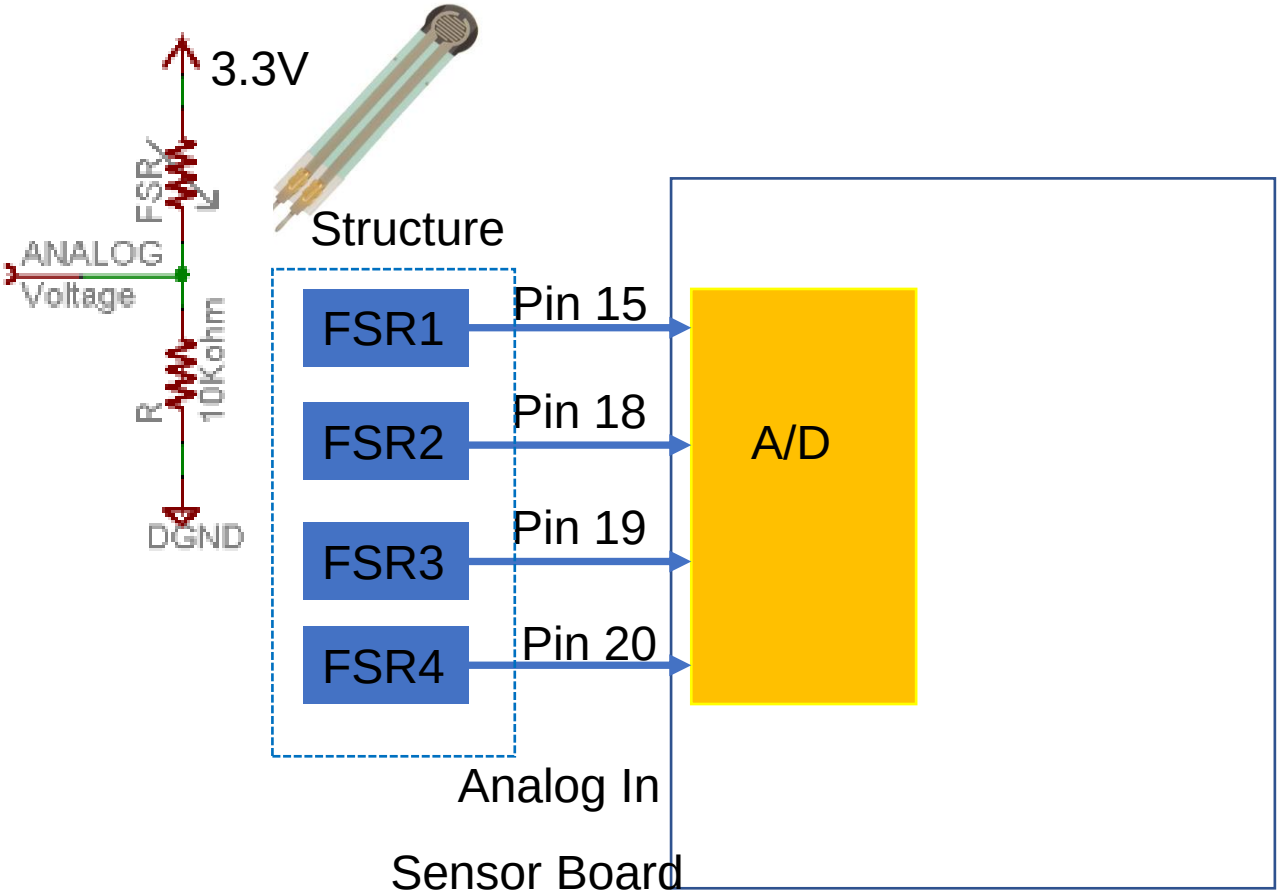
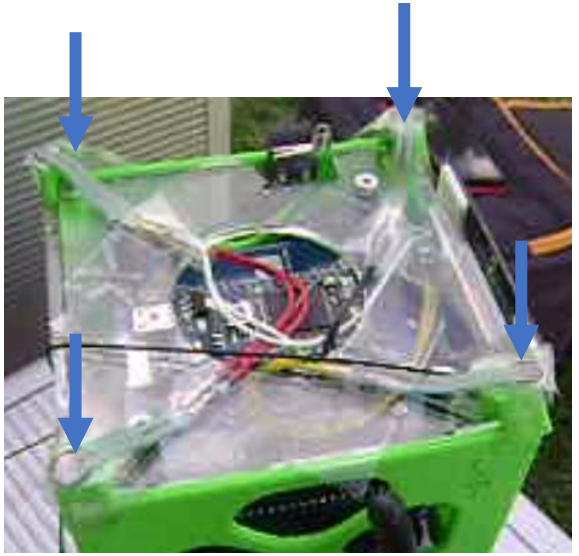
Payload Subsystem Architecture





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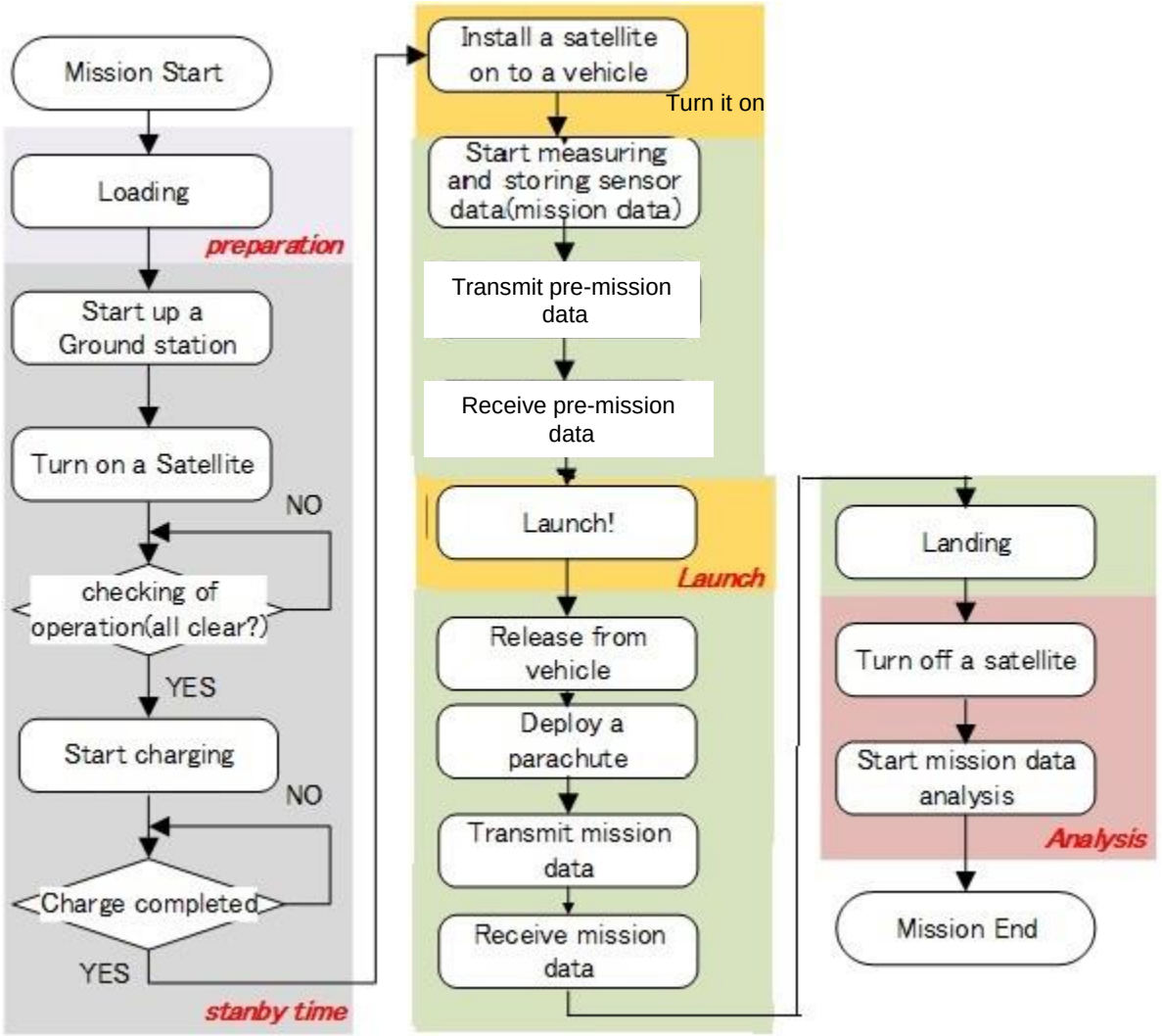
Mission Sequence



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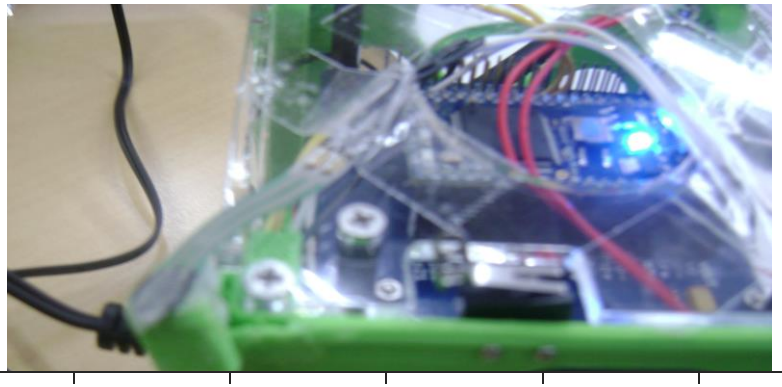
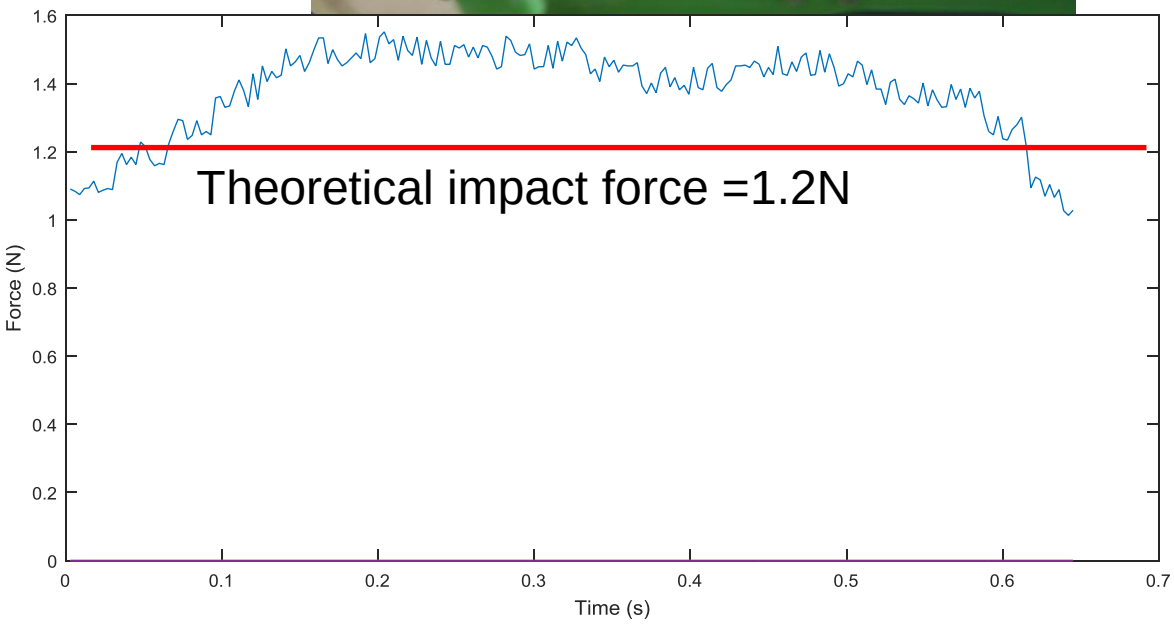
Validation and Verification Plan/Testing

(1) Payload

The satellite were dropped from a 50 cm height and data were recorded.

The load shows on one leg only and by inspection of satellite this leg was broken due to higher stress.





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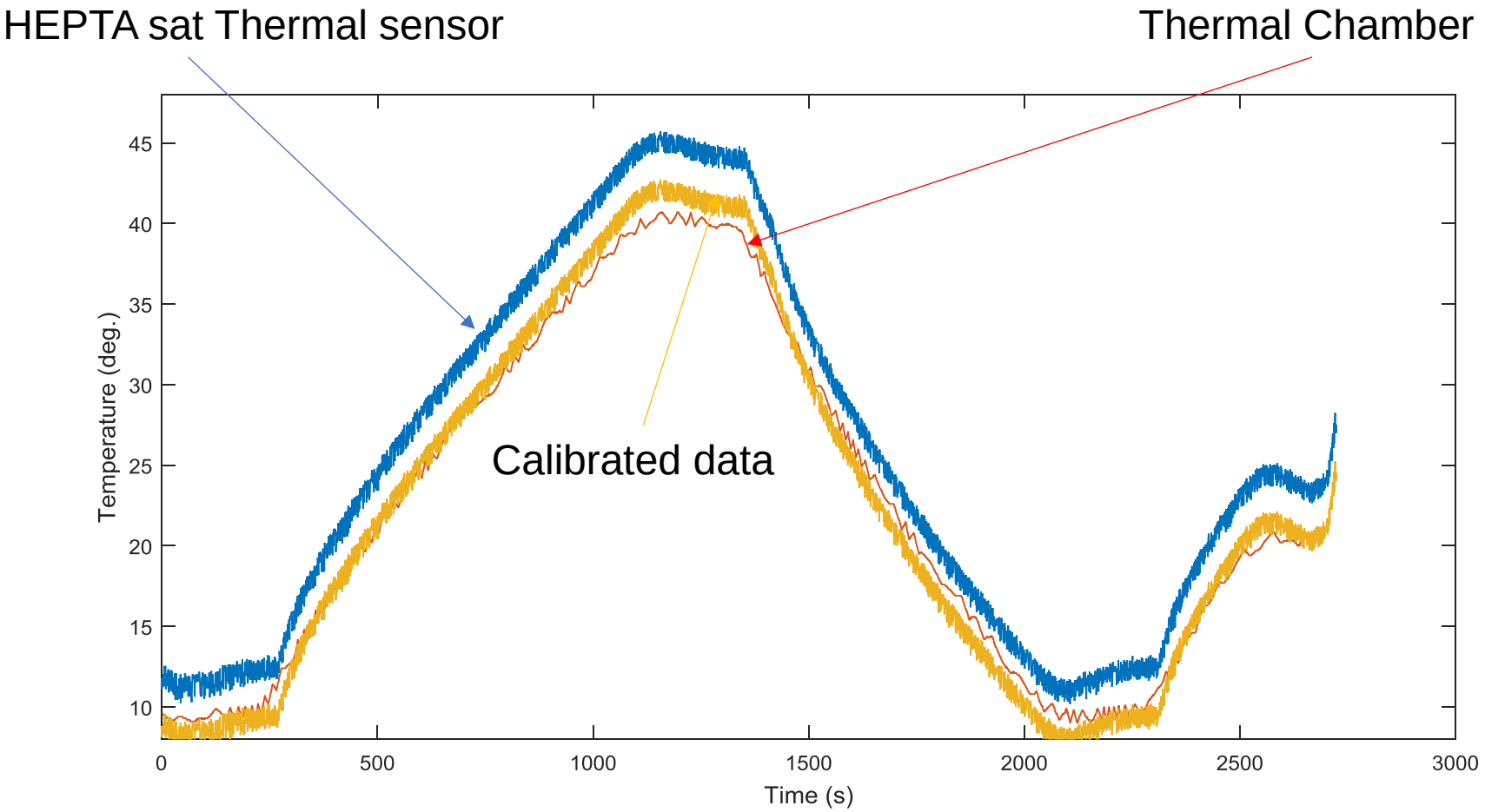
Validation and Verification Plan/Testing



(2) Thermal sensor calibration

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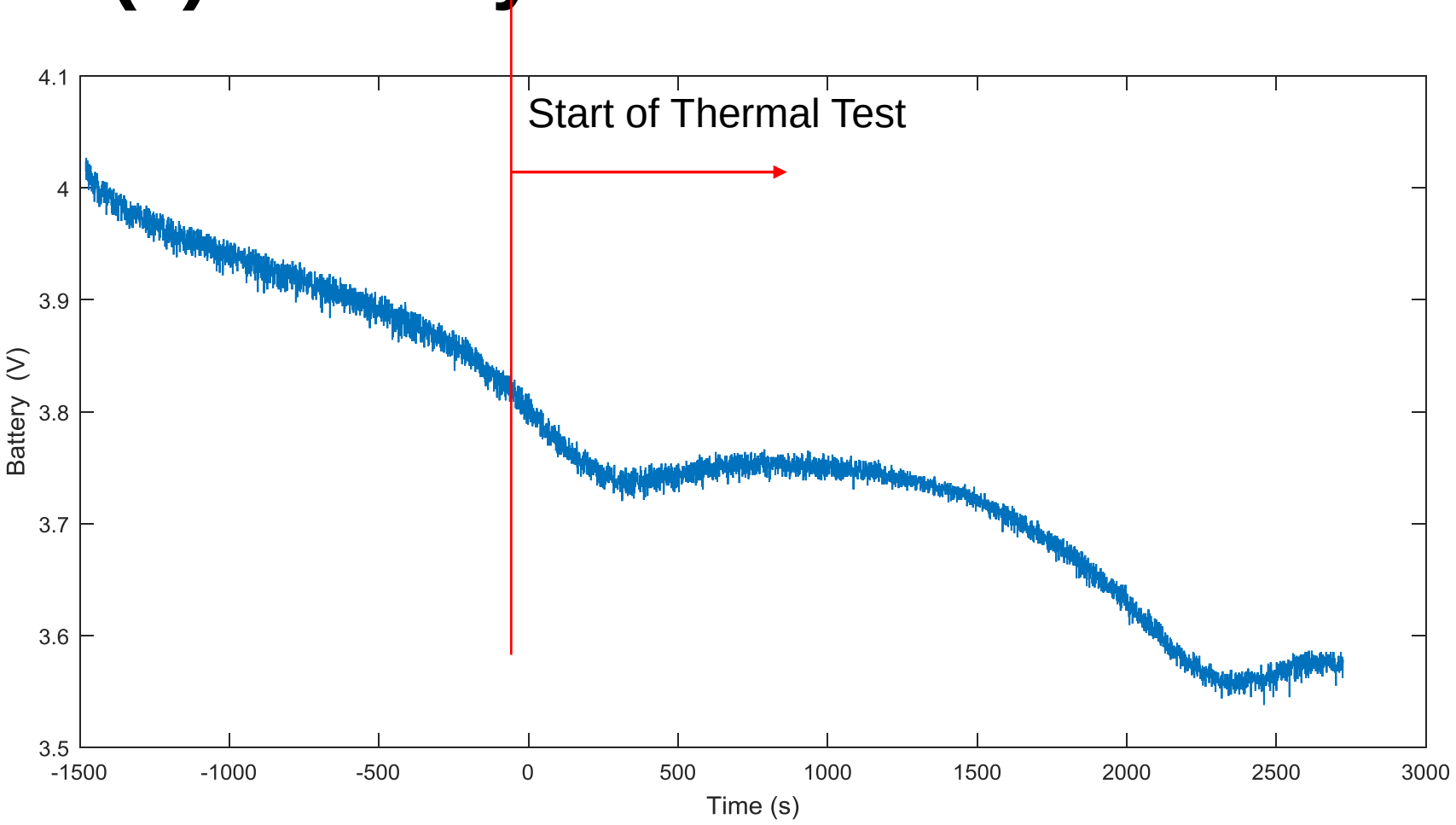
Validation and Verification Plan/Testing

(3) Battery Endurance Check



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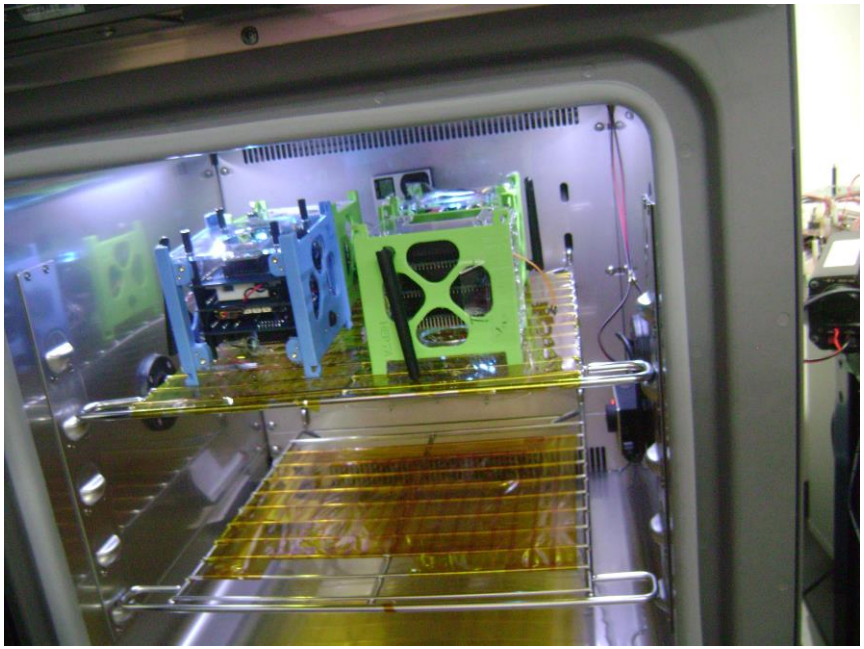
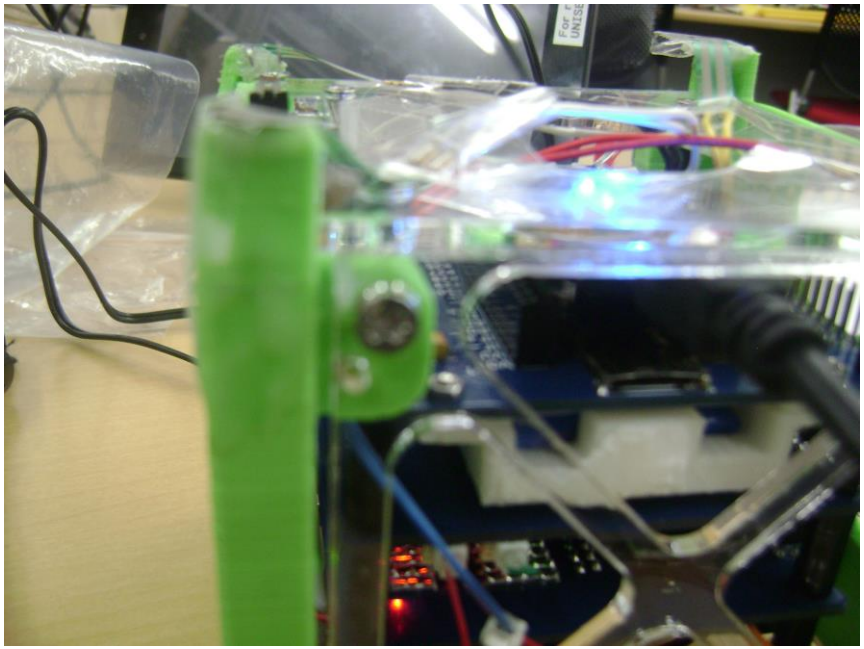
Validation and Verification Plan/Testing

(4) Communications with Xbee and data storage on the CD



Thermal Test



Drop Test

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Flight Result: First Attempt

- 9 axis sensor running and saving measurements to SD. **Minimum Success √**
- 9 axis sensor running and transmitting measurements to ground station (seems slower than expected). **Success mission √**

- No forces were recorded for the four FSR sensors. **Extra-Success mission !! need to wait for analysis**

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Flight Result: Second Attempt

- 9 axis sensor running and saving measurements to SD. **Minimum Success √**
- 9 axis sensor running and transmitting measurements to ground station (seems slower than expected – suspecting interference). **Success mission √**

- No forces were recorded for the four FSR sensors. **Extra-Success mission !! (need to wait for analysis**

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Flight Result: Third Attempt

- Keeping away from octocopter remote control.
- 9 axis sensor running and saving measurements to SD. **Minimum Success** √
- 9 axis sensor running and transmitting measurements to ground station. **Success mission** √
- No forces were recorded for the four FSR sensors.

Extra-Success mission !! need to wait for analysis

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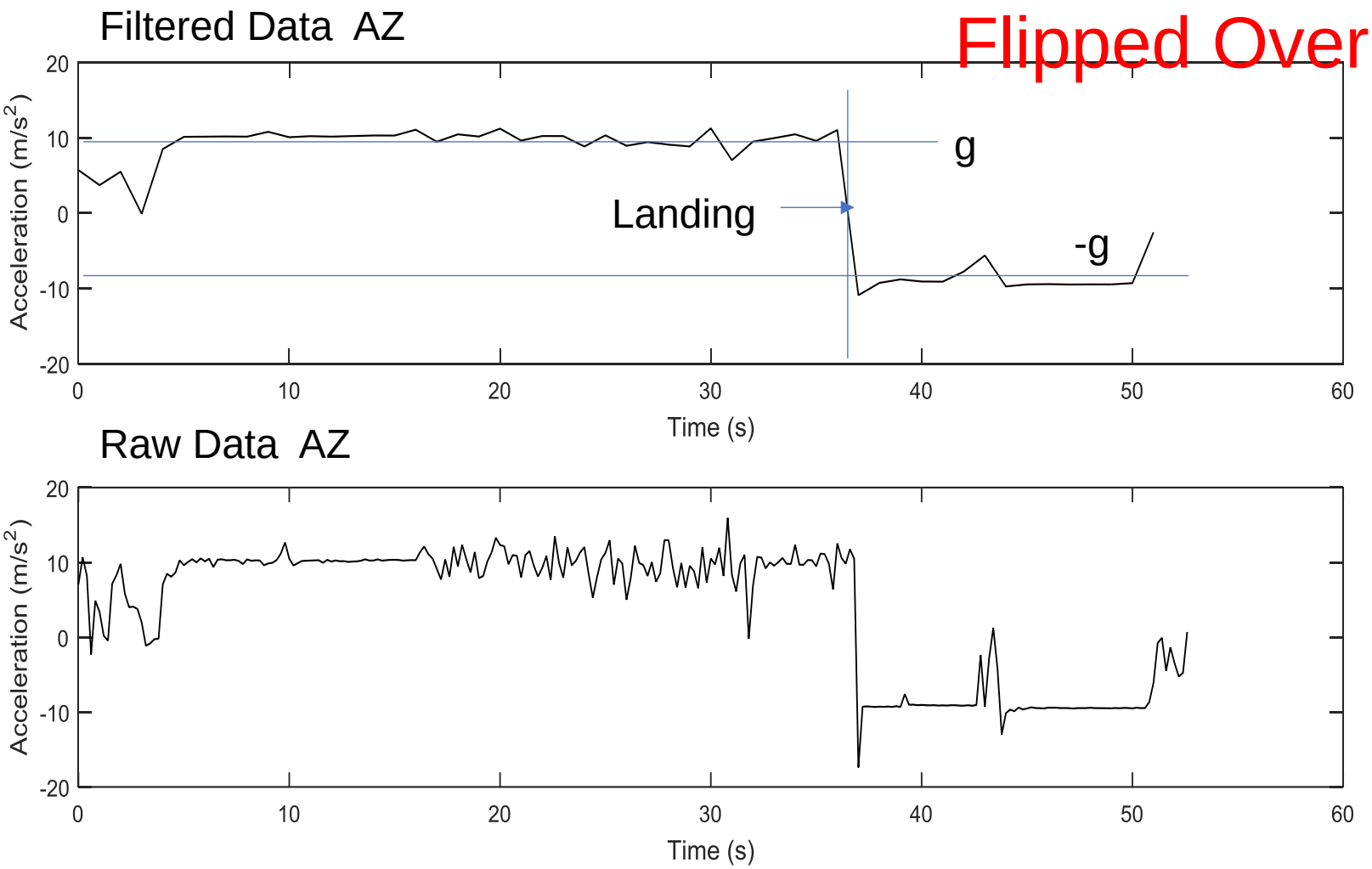
Analyzing Results (Test 1,2)

Satellite
Flipped Over !



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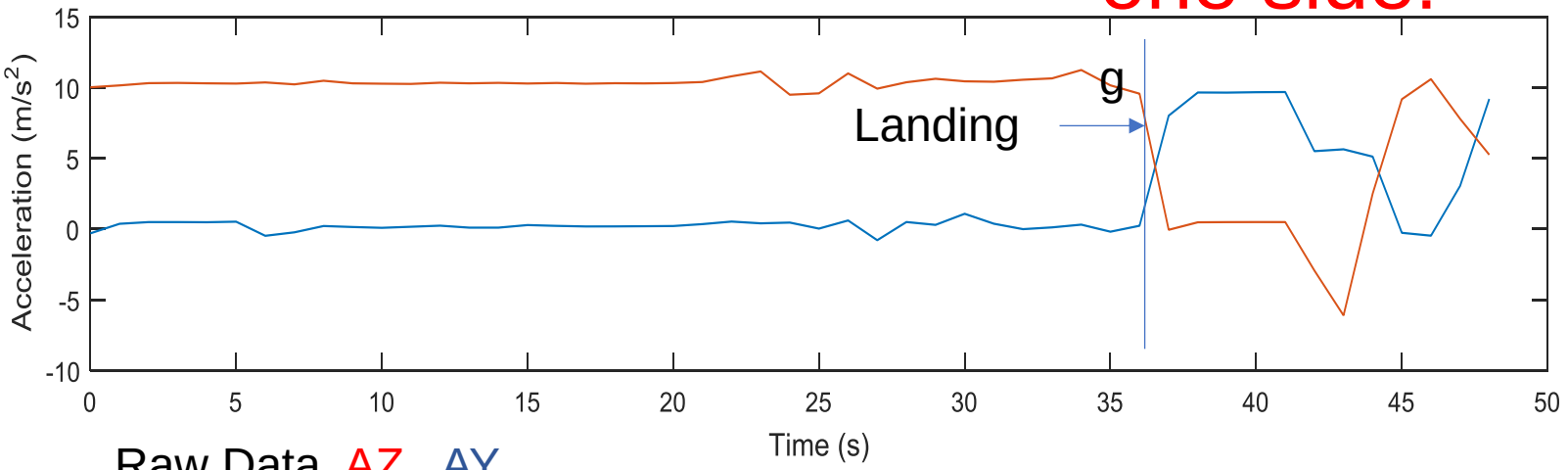
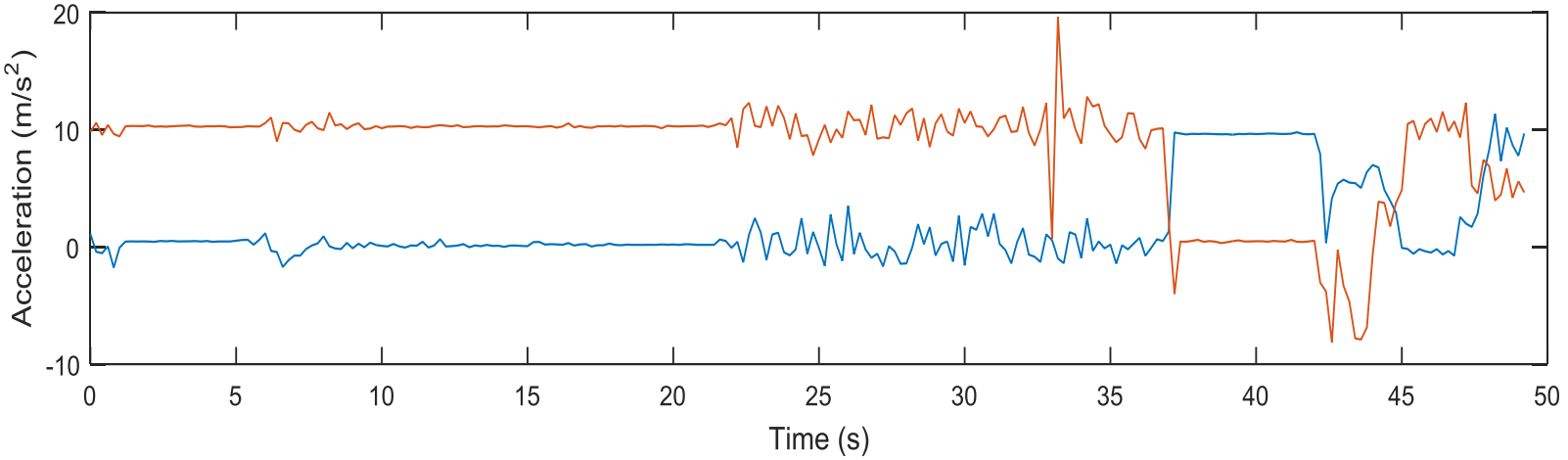
Analyzing Results (Test 3)

Satellite Fall on one side!

Filtered Data AZ, AY



Raw Data AZ , AY



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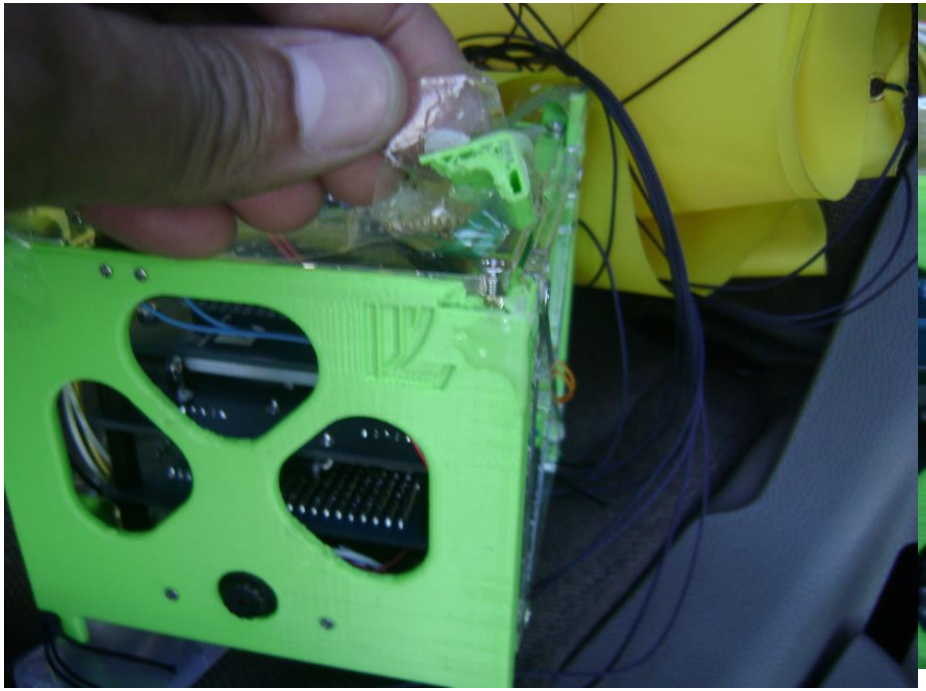
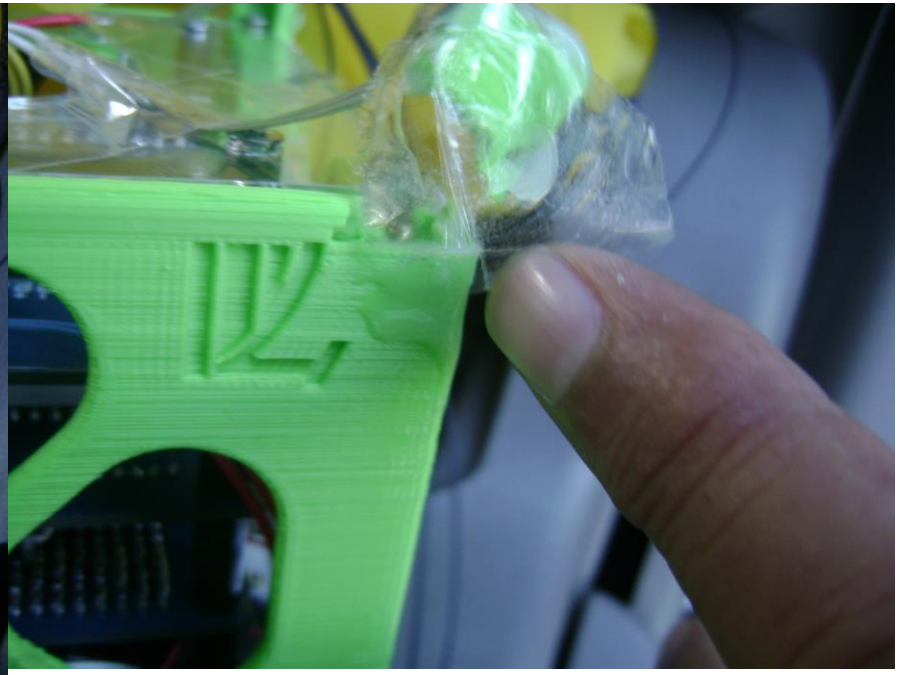
Controlled drop on Grass

I did several drops on the grass from random altitude and could get one reading each drop ranging from 400gf to 1500gf (4-15N)





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Conclusions

- FSR are working fine for calculating impact forces under controlled experiment (drop test).
- In real flight nothing can guaranty that the satellite will land on its
- legs.
- Impact force can break
- the leg of the satellite.

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Recommendation and Future Work (Mission)

- For FSR to work in general flight test, we need more on all sides of the satellites.
- I would like to model the satellite and the parachute motion dynamics.
- I would like to try different experiments and sensors

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Feedback and Recommendation (CLTP)

- Structure of the Hepta need improvement (strengthening the legs and parachute connections.
- A day or two more for the training period will be appreciated.

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