



# Functional Testing

Ngai Nam Chan Thomas (Presenter)

Hampus Östberg Falkner (Presenter)

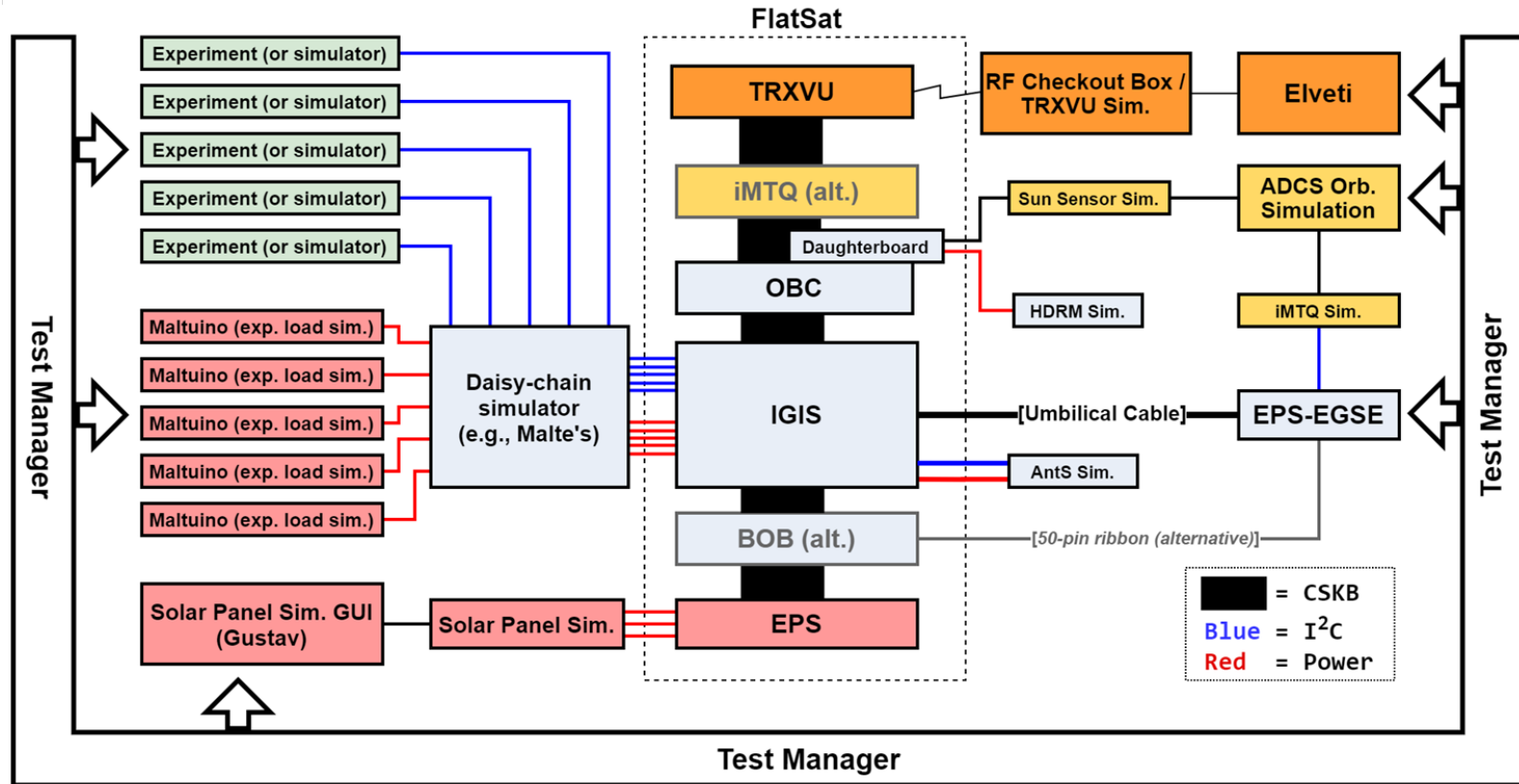
Joan Stude

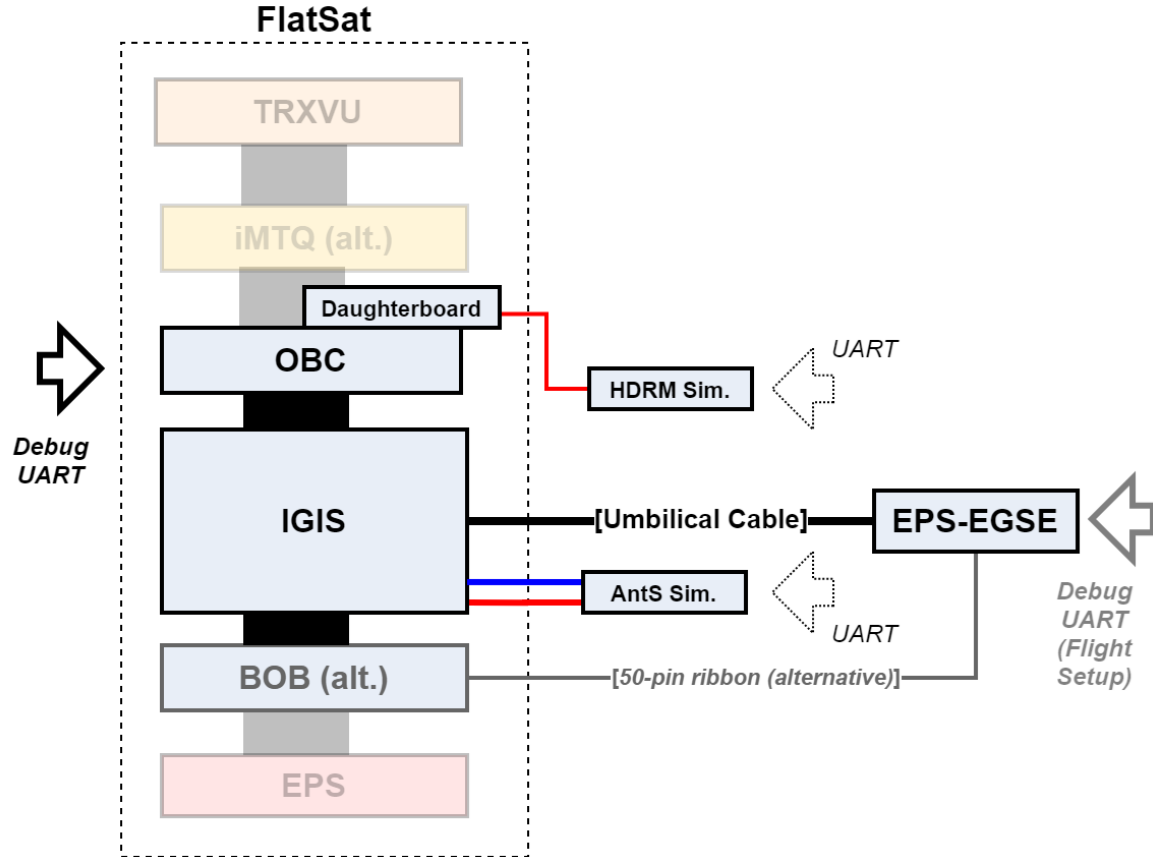
Dan Söderström

Hareekeshav Sethumadhavan Srinivasan  
(NanoProp Experiment) Matthias Rahu, Risha Haq



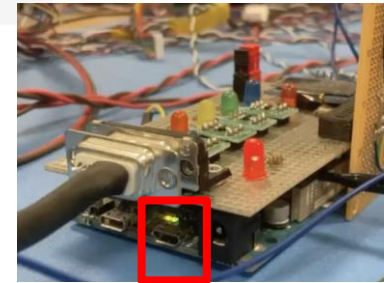
# Functional Testing System







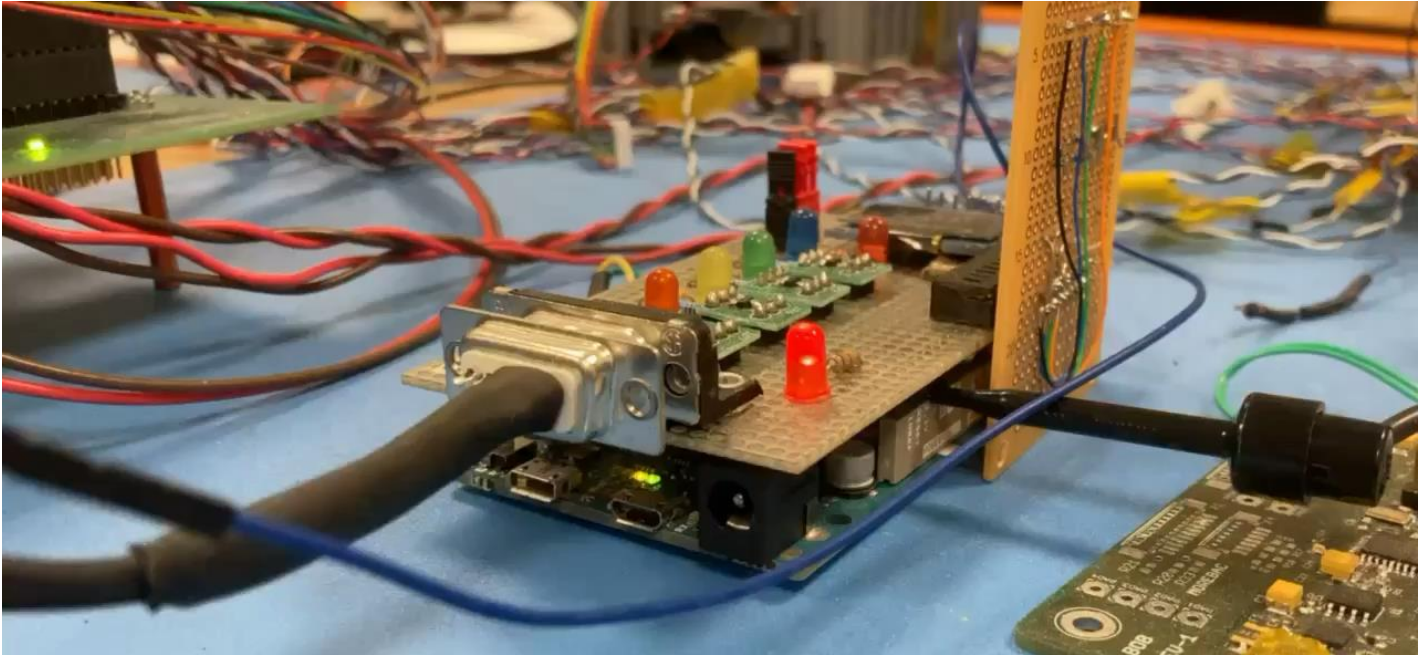
- **Work done since the beginning of semester:**
  - Design HDRM Sim. with power draw (reopened)
  - Investigate I<sup>2</sup>C SCL Error from Arduino Simulators
    - I<sup>2</sup>C Hanging on OBCSW reappeared
    - Implemented: simulators power by EPS → solved hanging (temporary)
- **Work remaining and tasks for next semester:**
  - New fcmd for AntS Sim. Deployment Rejection (Optional)
    - For possible integration with TS testing

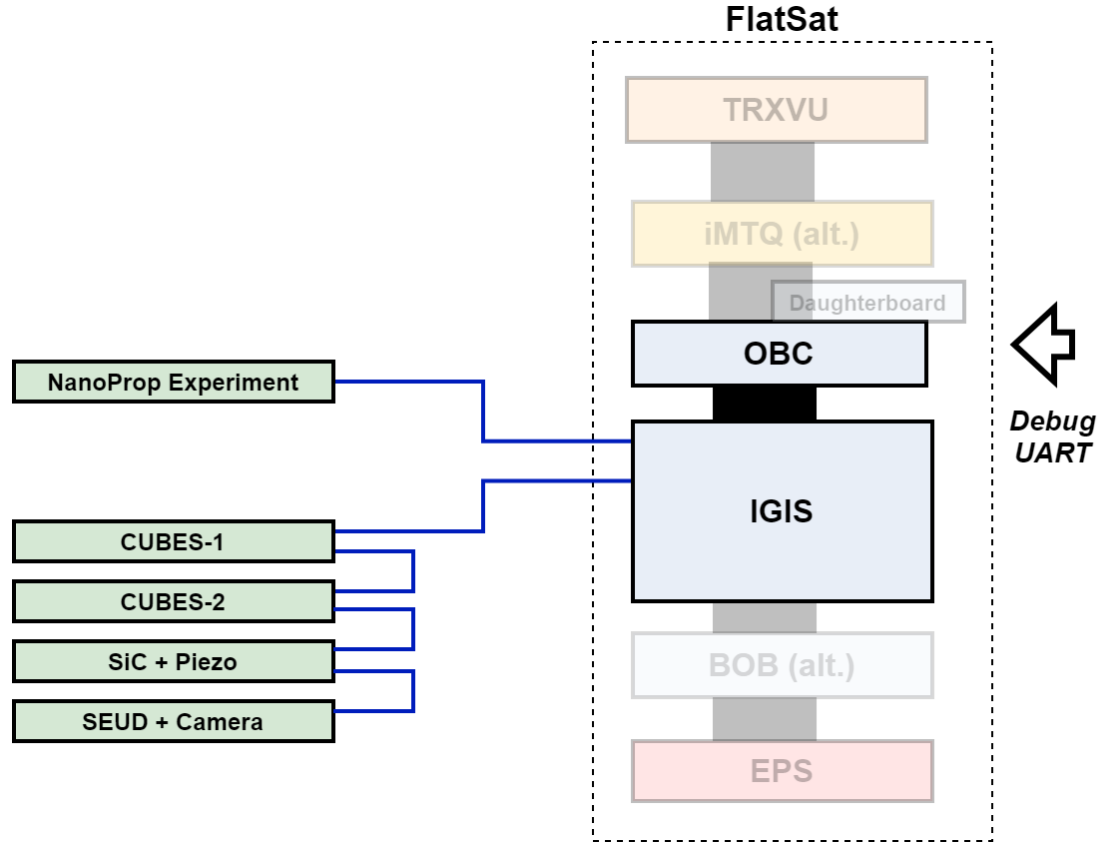


Arduino Sim.s now power-cycle with the FlatSat .

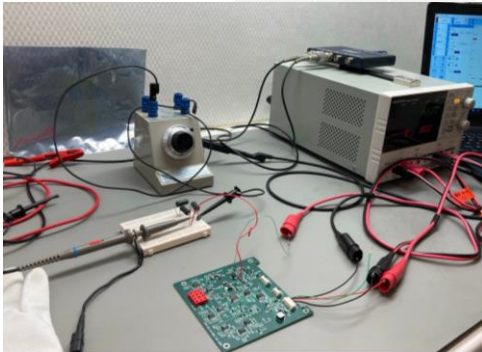


- Investigate I<sup>2</sup>C SCL Error from Arduino Simulators
  - AntS Sim. simultaneously responding to FlatSat power-cycling

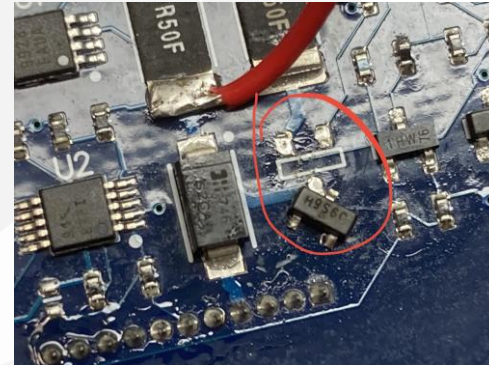




- Work done since the beginning of semester:
  - Test CUBES short-circuit & surge protection circuit
  - Replacing & Retest VBAT Protection components on Experiments
    - Resistor/Transistor replaced with aid
    - Retested + Verified on Max/Min Voltage (to confirm if flight ready/NCR)
  - Test LEGS Recalibration
  - NanoProp Experiment Check (safety verified by GomSpace)



VBAT Protection Circuit Test Setup on SiC.

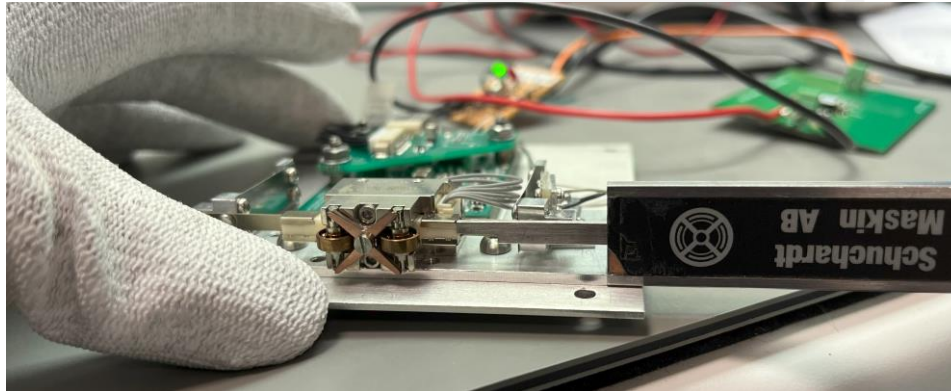


Incident of desoldered transistor on CUBES-1 (FIXED).



- **Test LEGS Recalibration**

- Completed recalibration with MECH team
- Calipers were used to measure stroke length
- End points were logged → Changes saved to LEGS



*LEGS Recalibration test*



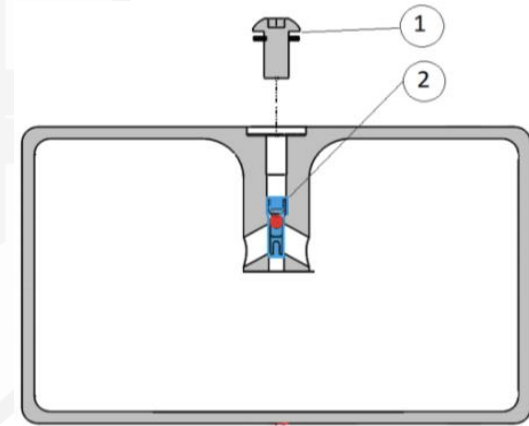


## • NanoProp Experiment Check

### ○ Thrusters Valves Check

- 1) Filled with  $N_2$  (safe pressure  $\sim 2.5$  bar) → **leaked** after filling tube removed
- $\therefore$  Require clarifications from GomSpace regarding filling procedures
- 2) Valve check proceeded with filling tube connected
  - Thruster **A&B DID NOT FIRE**
  - Thruster **C&D FIRED**
  - Software check + potential NCR ☹️

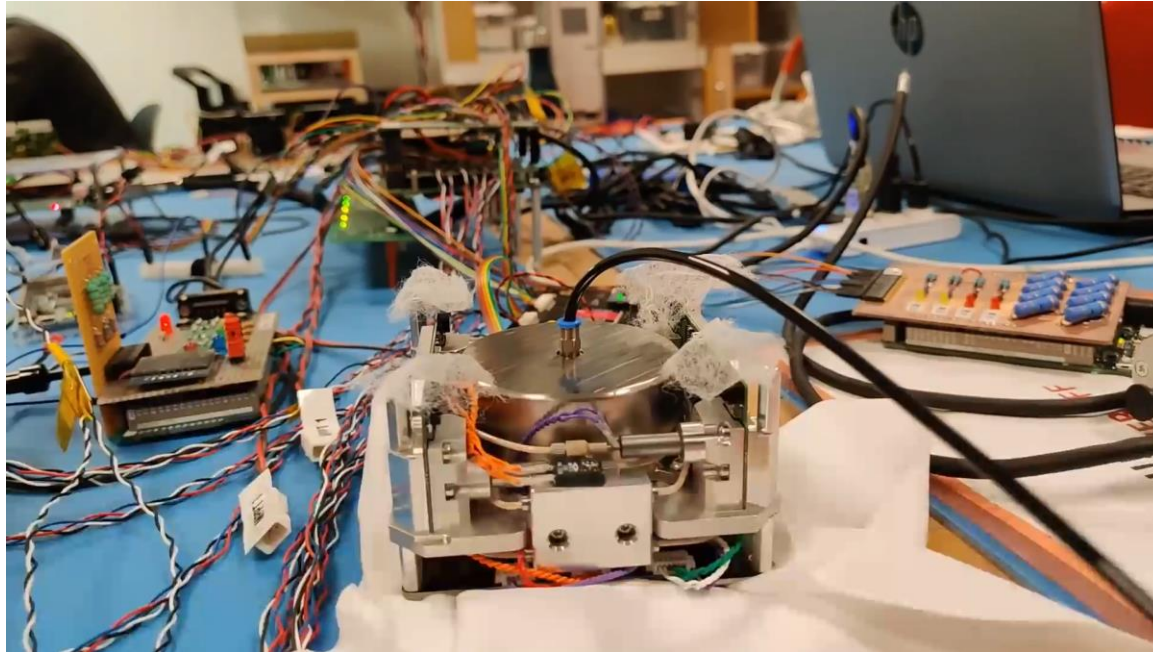
### ○ Power Interrupting Test (pending)



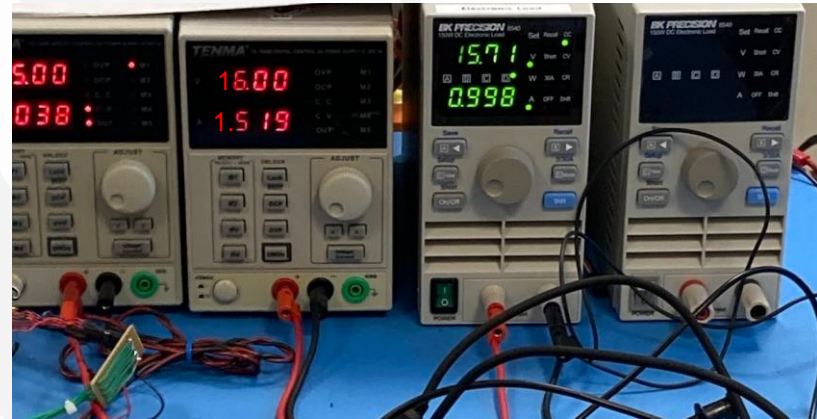
Problems with filling NanoProp: gas leaked out after the filling tube was removed



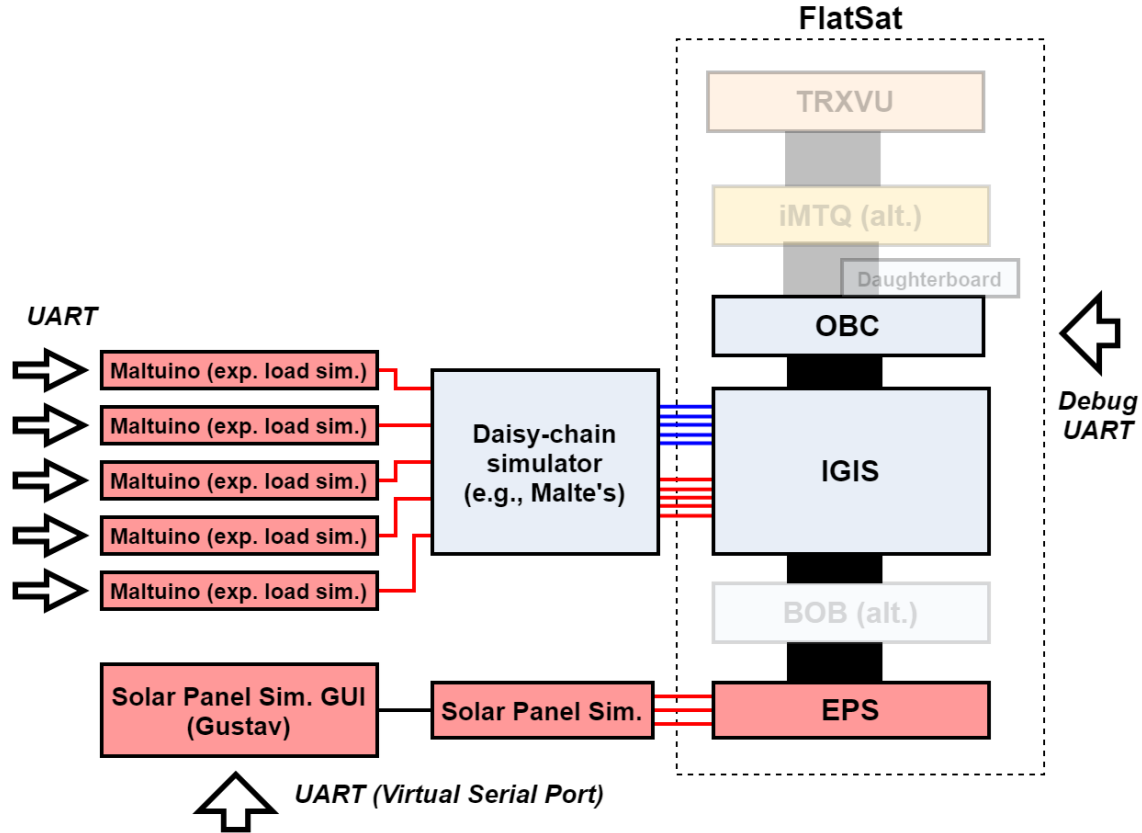
- **NanoProp Experiment Check – Thruster Valves Check Demo**



- Work remaining and tasks for next semester:
  - Check that experiments function at both Min/Max VBAT levels
    - Retest experiments due to VBAT protection circuit replacements
- When available:
  - Test SEUD & Camera



*Retest VBAT range on experiments deemed necessary.*





- **Work done since the beginning of semester:**

- Verify updated EPS I<sup>2</sup>C address via resets
- Flight Battery testing
- Test EPS I<sup>2</sup>C WDT
- Check EPS GND WDT Reset Counter Implementations
  - To confirm the final WDT reset actions (TC / dedicated calls)
  - GND WDT boot counts to be tested with **Flight Battery**

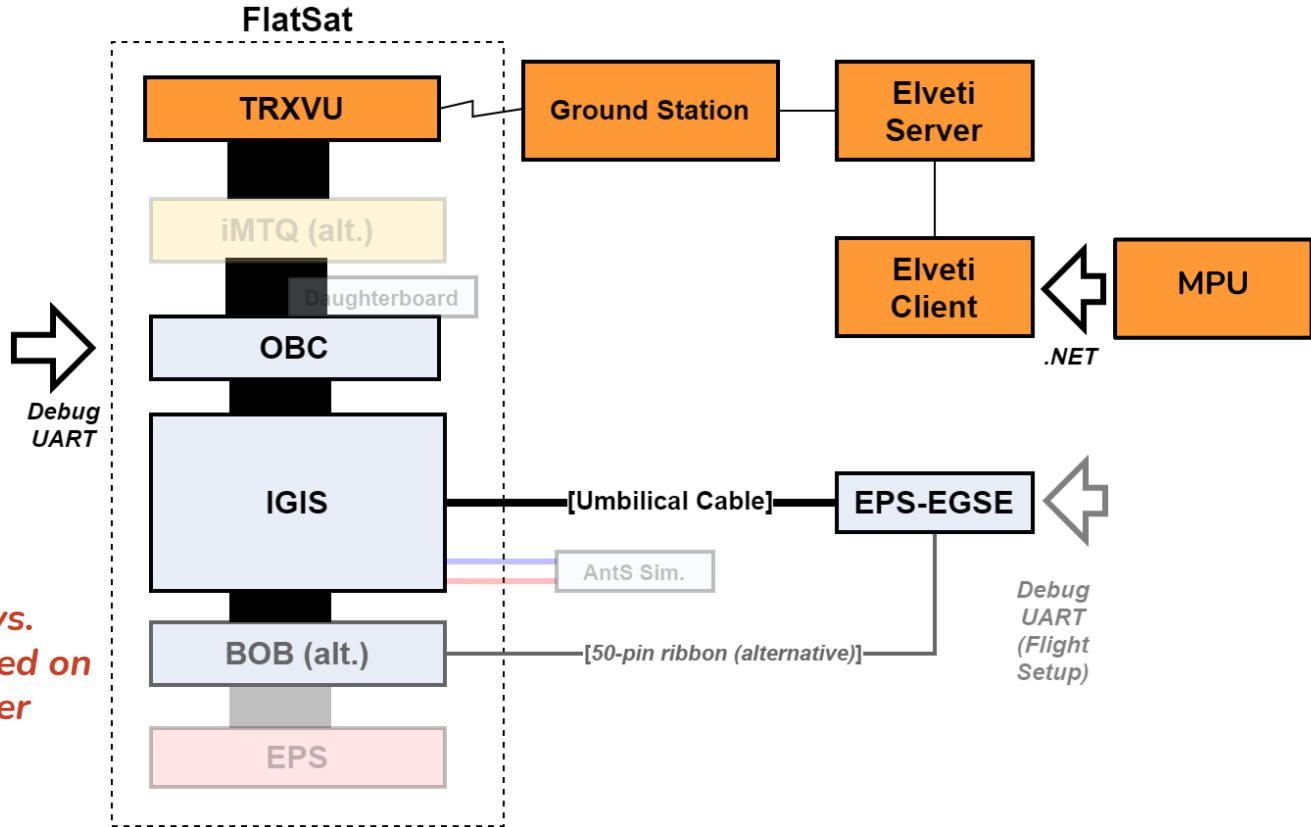
- **Work remaining and tasks for next semester:**

- Check P31us MPPT (pending, TBC)
- Test KS on active/connected/jumped config. w/o external power (with MECH team)
  - Discussed & Drafting Test Plans

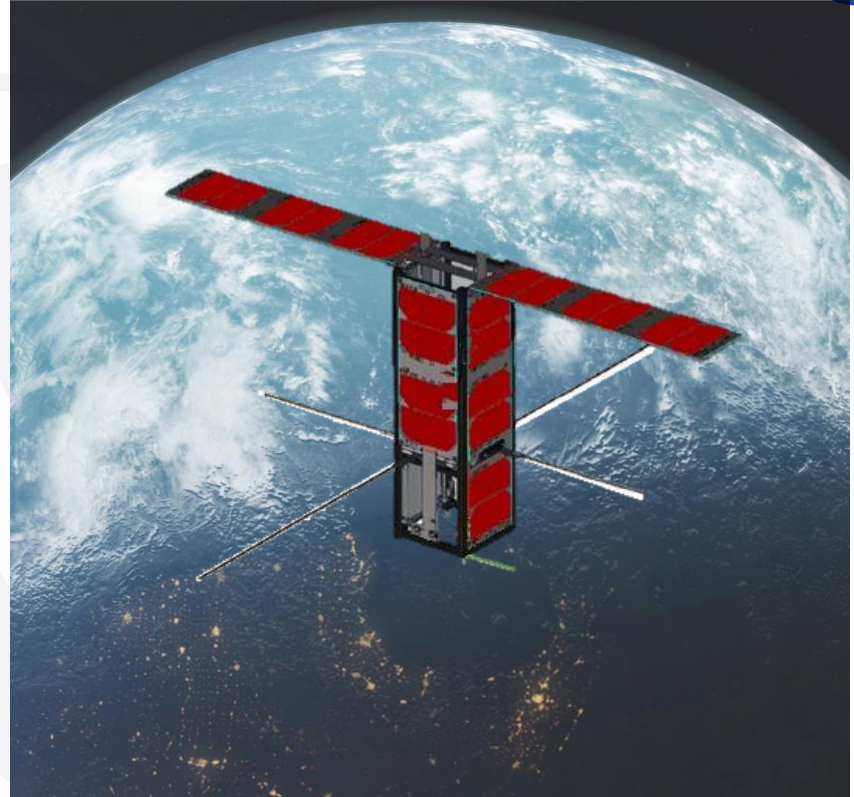
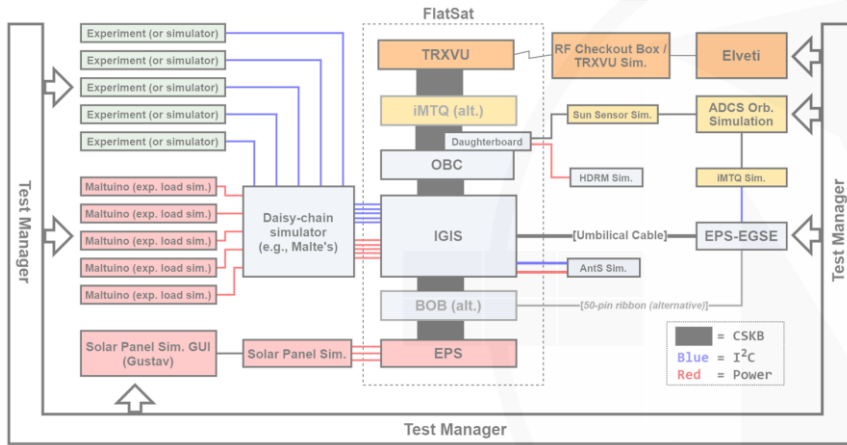
3. Get housekeeping data by running **option 1** from the OBC PuTTY window and make sure another reset has occurred and that the WDT has timed out as a result of the reboot penalization. Two reboots are expected: one from the hard-reset command and the other from the WDT timeout.

Parameter	Expected	Measured
EPS Boot Count	4	5
Last Boot Cause	1	7
WDTgnd Reset Count	1	1
WDTgnd Time Left	<= 7200	3600

*GND WDT boot counts deemed existed in previous tests (c.f. M631-008/v2)*



*Sat. Comms. Subsys.  
has not been worked on  
during this semester*





- Work on-going since the beginning of semester:
  - Test Initialization Phase
- Current Progress:
  - Test with HDRM sim. → Done (except optional ftcmd)
  - Test with AntS sim. → Done (marginal)
    - Retested updated auto-deployment logic
    - Try 6 attempts (3 times on both Side A&B) for the deployment (FDIR)
  - Test with 30-mins loop → In Progress
    - TS Timer & test sequences made to check against OBCSW
    - **Problems:** OBC debug logs parsing into TS **could not achieve real-time**
    - More **time-efficient** implementation needed
      - Related task: **OBC Debug Log readout from Python instead of TS**





- **Updates & Ongoing Plans**

- Documentations should be **prioritized critically**
  - More than 20 documents pending review
  - MIST Wiki to update
- New FT TAs for Onboarding
- Gain more understanding on **Mission Modes** for designing **mission simulation tests (across all teams)**

## Send TC via Single Client Script or MPU

Useful TC: put ones we always use here, and visit [Mission Information Base \(MI](#)

GS Pass, Start Experiments (**APIDs**), Time (set, sync, HMAC key), Payloads (CUF

Troubleshooting mode, TM modes, EPS related...

**TODO {**

In default, if OBC detects any error (e.g. we don't have solar panels now and the Mode and no experiments will respond to TC. To test the experiments, send the

*MIST Wiki FT sections to update.*

