



Cansat Leader
CLTP
Training Program



**CanSat Leader Training
Program (CLTP) - 8th Cycle**



Final Mission Report

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Ryuichi Sekita

Department of Smart System
School of Engineering
Fukuyama University



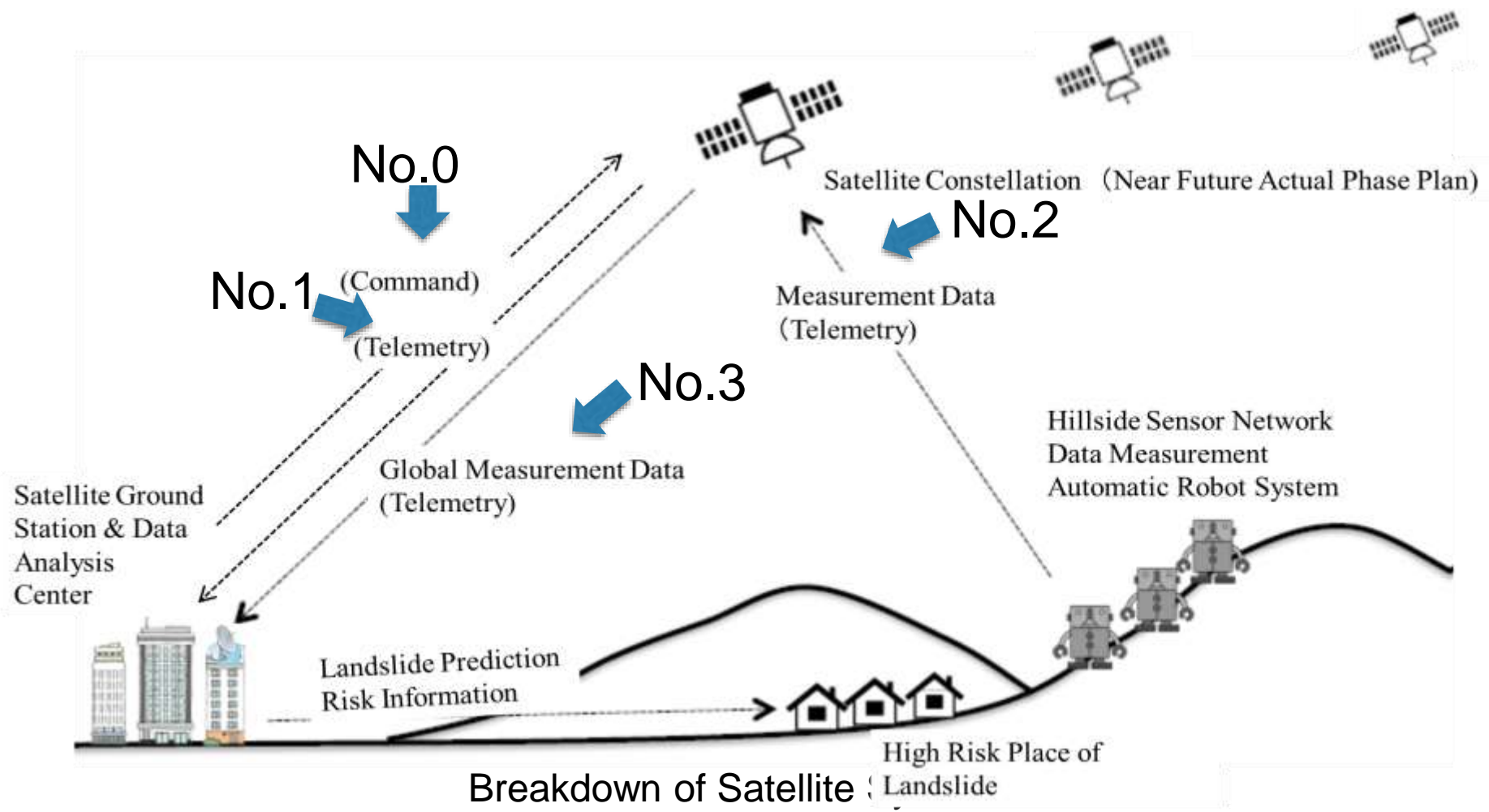
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Content

- Mission Statement
- Mission Requirements Validation and Verification Plan
- The Satellite System
- Bus System
- Payload Subsystem
- Mission Sequence (Result)
- Verification Sheet
- Flight Results First Attempt
- Flight Results Second Attempt
- Conclusion
- Recommendation and Future Plan (Mission)
- Feedback and Recommendation (CLTP)

Mission Statement

Extract Some Essence from My Research Mission



Mission Statement

Mission No.0: Mission Ready Phase

Satellite should be Power Save Mode and Install Container

Before drop, Set Ready to Do Mission by Full Power Command from GS

Mission No.1: Telemetry Gathering Phase

Satellite should Gather Telemetry Data

(Acceleration, GPS data, Bat Vol. Temp.)

Mission No.2: Data Store Phase

Satellite should Receive the Random Number as Dummy Data from Ground (GS)

Mission No.3: Data Forward Phase

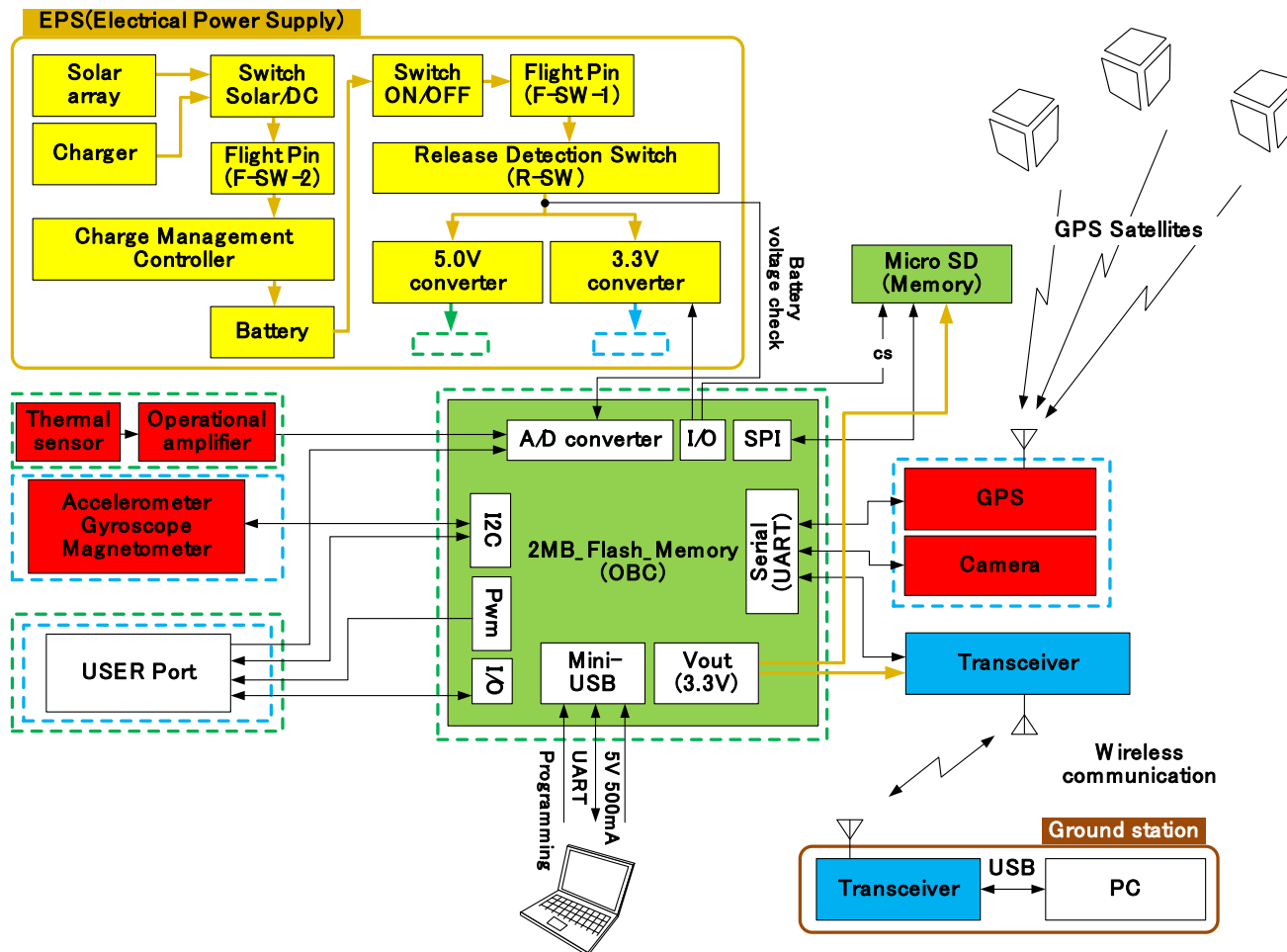
Satellite should Sending Picture Data and Telemetry Data to GS

Mission Requirements Validation and Verification Plan

No.	Event	Requirement	Function	Verification
1	Standby Phase	Battery Voltage is 4.0V or more	Battery Charge Function	Visual Inspection
2	Launch Phase	Set Power Save Mode Automatically by SW	Mbed Sequence	Soft Test
		Set Full Power Mode by Command and Confirm Full Power in GS	GS Command Print Vout in GS	Soft Test
3	Mission Phase	Receive Random No.	GS Command and Transceiver Function	System Test
		Receive Snapshot Command	GS Command and Snapshot Function	Soft Test and Camera Test
		Receive GPS signal Measure Accel. Temp. Volt.	GPS Receiver Function and Telemetry Function	System Test and AT
		Endure Landing Shock	Good Structure and Good Assembly	Visual Inspection
4	Analysis Phase	Final Presentation should be Good		Final Presentation Output

Bus System Architecture

- No Additional Parts with Original HEPTA-Sat



Payload Subsystem Architecture

- Original HEPTA-Sat Camera and Sensors
- No Additional Sensor and Components
- Software for both Sat. and GS should be modified to Appropriate Mission Function

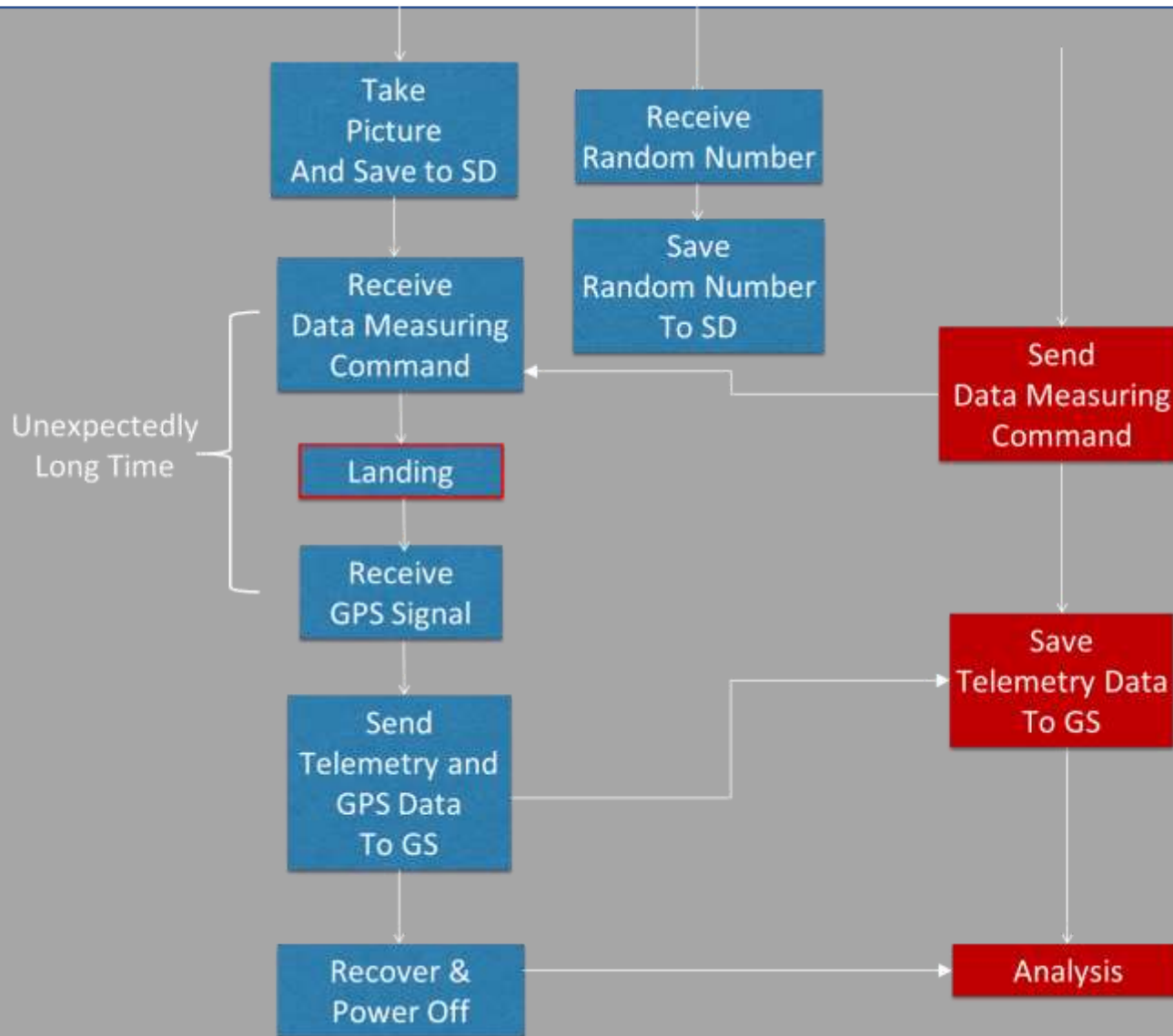
Verification Sheet

No.	Event	Requirement	Function	Verification	Result
1	Standby Phase	Battery Voltage is 4.0V or more	Battery Charge Function	Visual Inspection	3.5V (Not Charged) Replace New One
2	Launch Phase	Set Power Save Mode Automatically by SW	Mbed Sequence	Soft Test	Good
		Set Full Power Mode by Command and Confirm Full Power in GS	GS Command Print Vout in GS	Soft Test	Good
3	Mission Phase	Receive Random No.	GS Command and Transceiver Function	System Test	Partially Good (Not Solved)
		Receive Snapshot Command	GS Command and Snapshot Function	Soft Test and Camera Test	Good
		Receive GPS signal	GPS Receiver Function and Telemetry Function	System Test and AT	AT analysis is not finished yet
		Measure Accel. Temp. Volt.	Good Structure and Good Assembly	Visual Inspection	Good, but 1 leg was Broken during Preparation Replace New One
3	Mission Phase	Endure Landing Shock			
4	Analysis Phase	Final Presentation should be Good	Sekita's Analysis Ability	Final Presentation Output	Good

Mission Sequence (Result)



Mission Sequence (Results)



Flight Result: First Attempt

HEPTA Ground Station Software ver.1

Start/Stop Control

Start Acquisition Close window

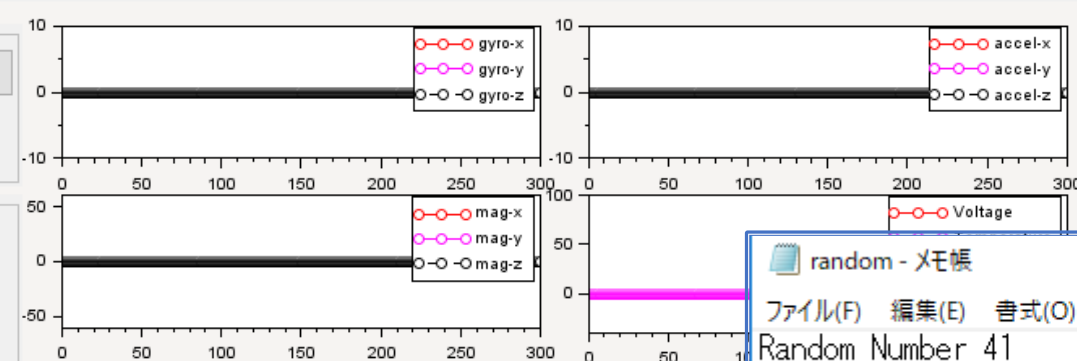
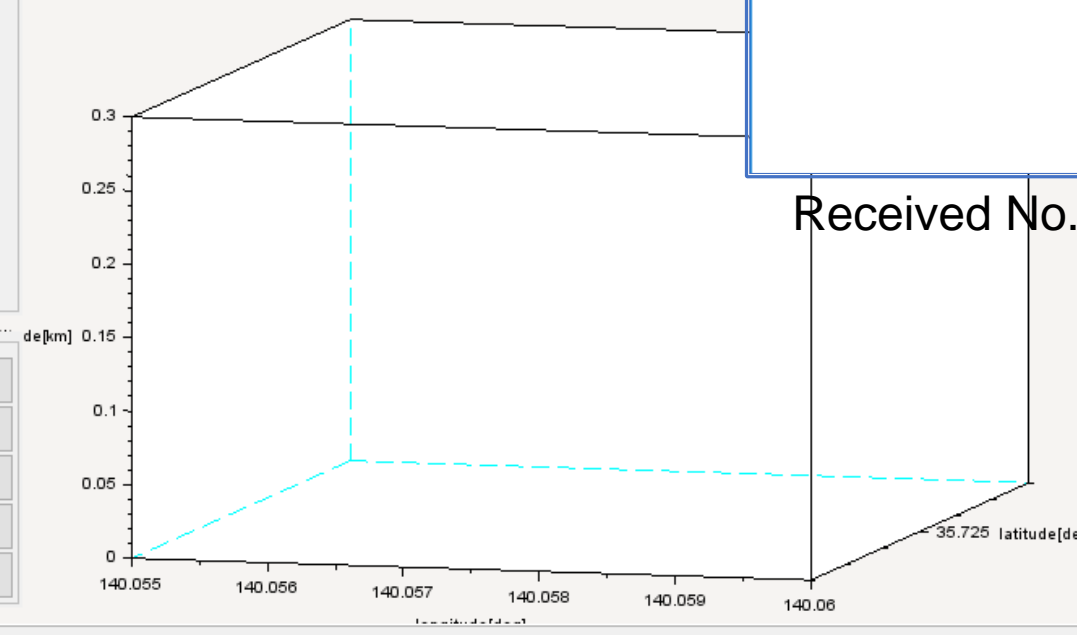
Stop Acquisition: *Ctrl+x*
(in the Console Window)

データ

Random No.	3	
gyro-y	0	[rad/s]
gyro-z	0	[rad/s]
accel-x	0	[m/s ²]
accel-y	0	[m/s ²]
accel-z	0	[m/s ²]
mag-x	0	[μT]
mag-y	0	[μT]
mag-z	0	[μT]
latitude	0	[deg]
longitude	0	[deg]
altitude	0	[km]
Voltage	0	[V]
Temperature	0	[°C]

Command

Generate Random No.	Gyro Sensing
Accel Sensing	Magnetometer Sensi...
Lat, Long and Height...	Temp Sensing
Camera Snapshot	All Transmitting Mode
Full Power Command	Command10

random - メモ帳

ファイル(F) 編集(E) 書式(O) 表示(V) ヘルプ(H)

Random Number 41

Received No. in HEPTA-Sat

Flight Result: First Attempt

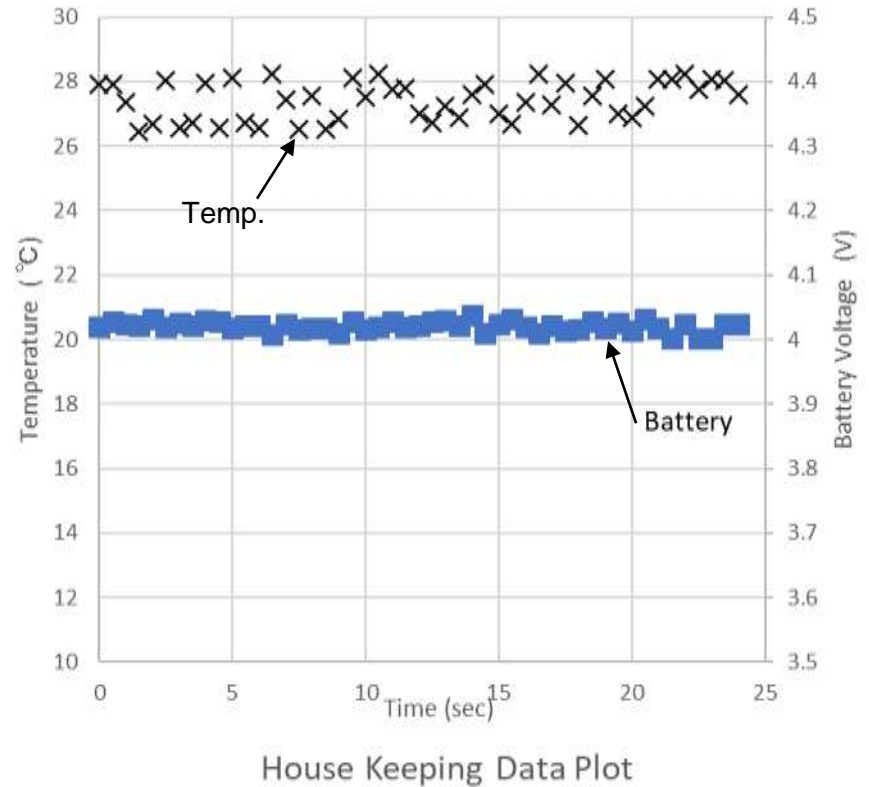
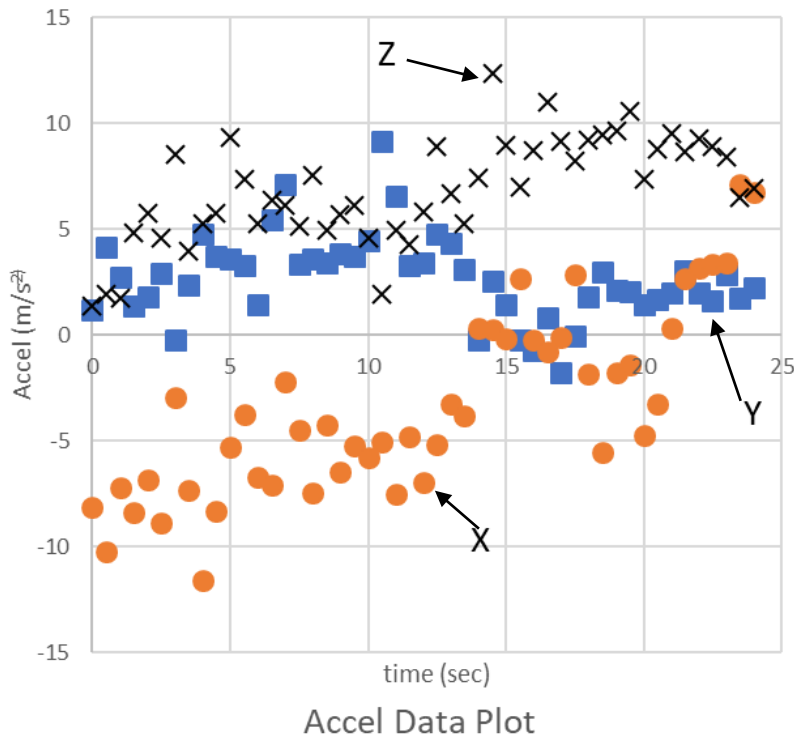


HEPTA-Sat Snap Shot

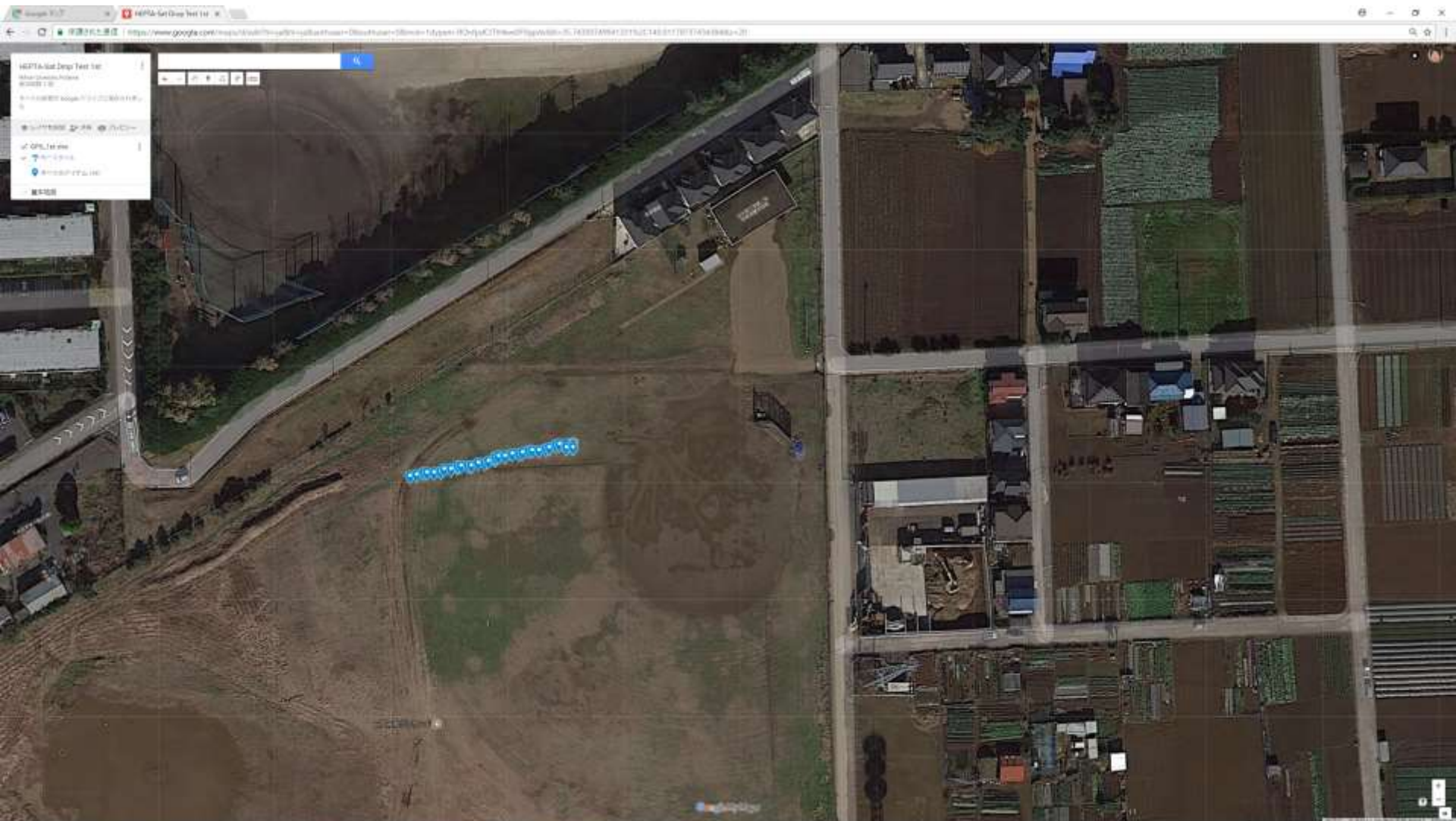
Flight Result: First Attempt



Flight Result: First Attempt



Flight Result: First Attempt

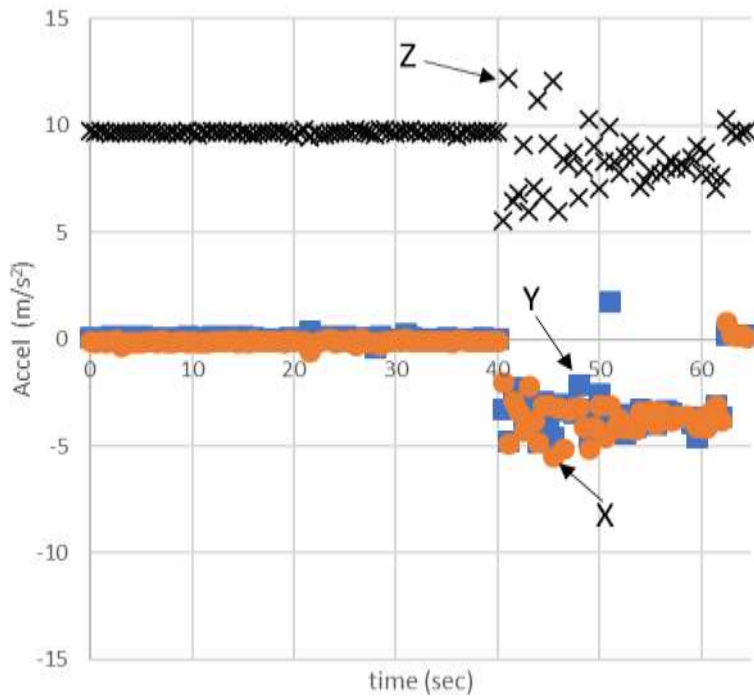


Flight Result: Second Attempt

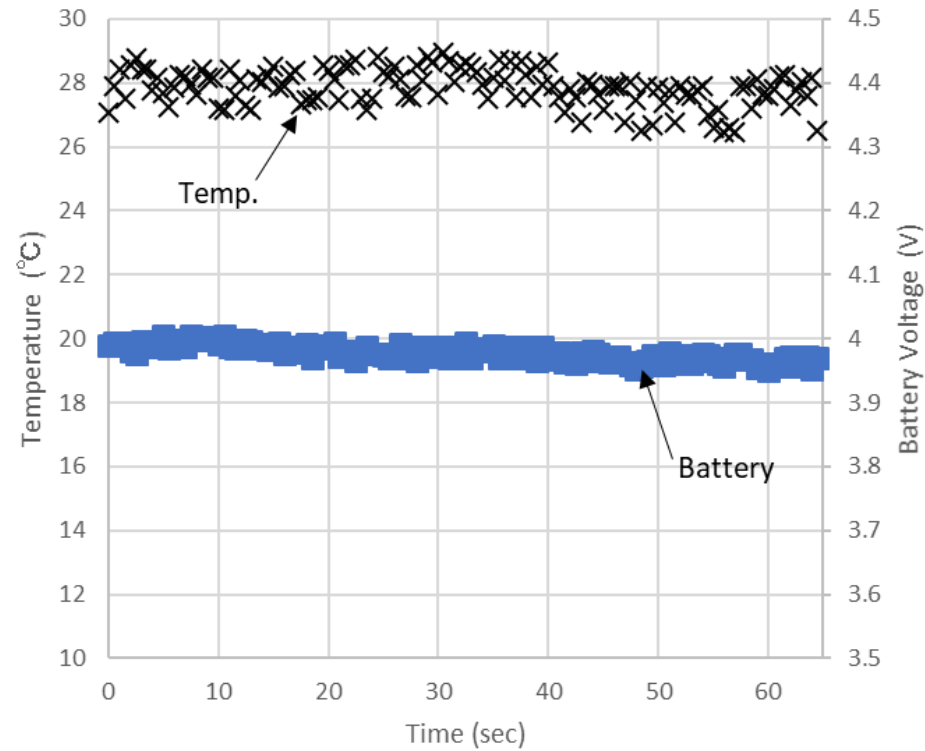


HEPTA-Sat Snap Shot

Flight Result: Second Attempt

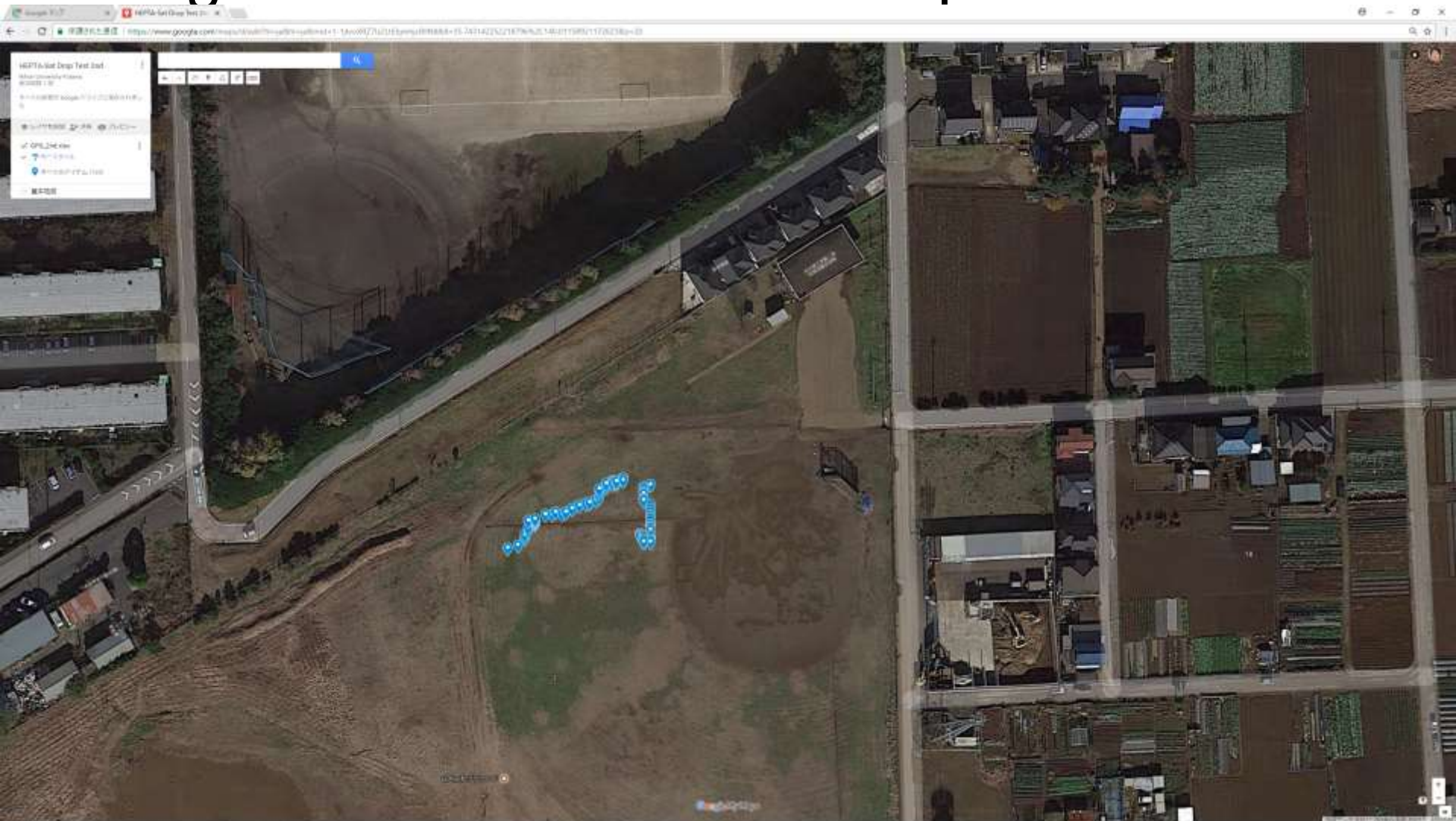


Accel Data Plot



House Keeping Data Plot

Flight Result: Second Attempt



Conclusions

- My HEPTA-Sat System Achieve Minimum Mission Success

Success Level	Mission No.	Contents	Result
Minimum	Ready Phase 0	<i>Satellite should be Power Save Mode and Install Container</i>	Complete
	1	<i>Set Ready to Do Mission by Full Power Command from GS</i>	Complete
		<i>Satellite should Gather Telemetry Data (Acceleration, GPS data, Bat Vol. Temp.)</i>	Complete
Full	Data Stote 2	Satellite should Receive the Random Number as Dummy Data from GS	Complete
	Data Forward 3	Satellite should Sending Picture Data and Telemetry Data to GS	Incomplete during Mission Time, but Complete after Landing
Extra	Upload GPS Track Data to Google Earth	Satellite should Receive GPS Raw data and Save in SD card	Incomplete using Raw Data, but Complete GPGGA Data to Google Map

Recommendation and Future Work (Mission)

- AT Varidation
 - Calculate and Analysis of AT Data
(Hexadecimal → Decimal → Physical Quantity)
 - Write Adequate Test Data Acquisition Code
- Quality Control and System Test Plan
 - Prepare for some System Trouble and Parts Failure
 - Develop Systematic Testing Plan
- Software Improvement
 - My MBED code must be improved to match GS Sending Random Number and HEPTA-Sat Receiving Random Number
- S&F Mission Simulation
 - Develop some Ground Sensor Data Receiving Function
 - Develop Full Automatic MBED Sequence after Receiving Full Power Command
- Build Up PBL Program using HEPTA-Sat

Feedback and Recommendation (CLTP)

- Well Work out Program and Basically No Problem
- Two Option Models
 - No.1: Original Model (Easy to Assemble)
 - No.2: Soldering Necessary Model (Like a i-CanSat, Difficult to Assemble)
- There are some explanations that are difficult to understand and difficult to practice
- Printed Text Book is better than the Pad Version for me
- Is it enough to understand Systems Engineering and Management?
 - Probably, some R&D experience should be needed for the understanding

Thanks for All !
&
See You Again
Near Future,
R&D Site