CanSat Leader Training Program (CLTP) - 8th Cycle

Final Presentation

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Cansat Leader CLTP Training Program

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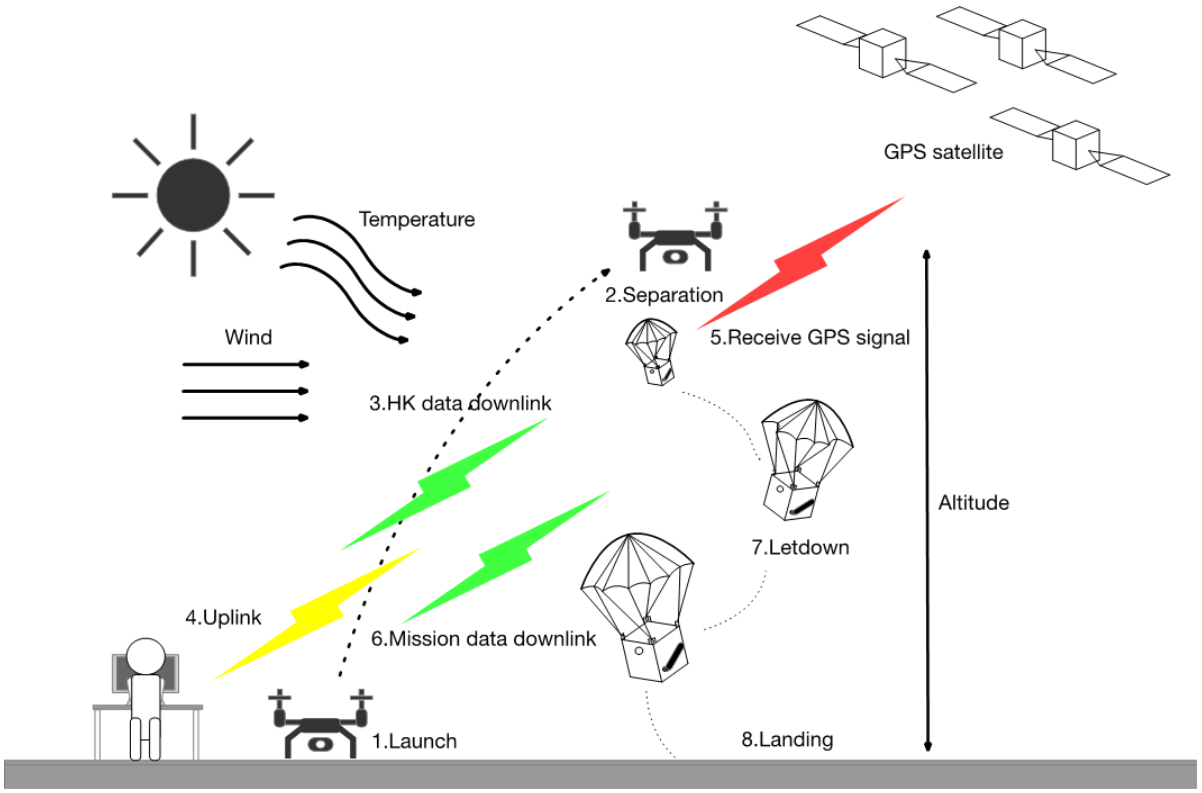
Content

- Mission Statement
- Mission Requirement(s)
- The Satellite System
- Bus System
- Payload System
- Mission Sequence
- Validation and Verification Plan/Testing
- Flight Results
- First Attempt
- Second Attempt
- Third Attempt
- Conclusion
- Recommendation and Future Plan (Mission)

Mission Statement

- “Comparing Uncalibrated Magnetometer and Magnetic Model (IGRF) Results”



Mission Statement

- In this mission, only GPS and magnetometer data is collected and written to the SD card, while sending them ground station synchronously.
- After landing, GPS data is used to calculate magnetic field with a magnetic model (IGRF12).
- And both data is compared, in order to see effects of uncalibration on magnetometer.

Mission Statement

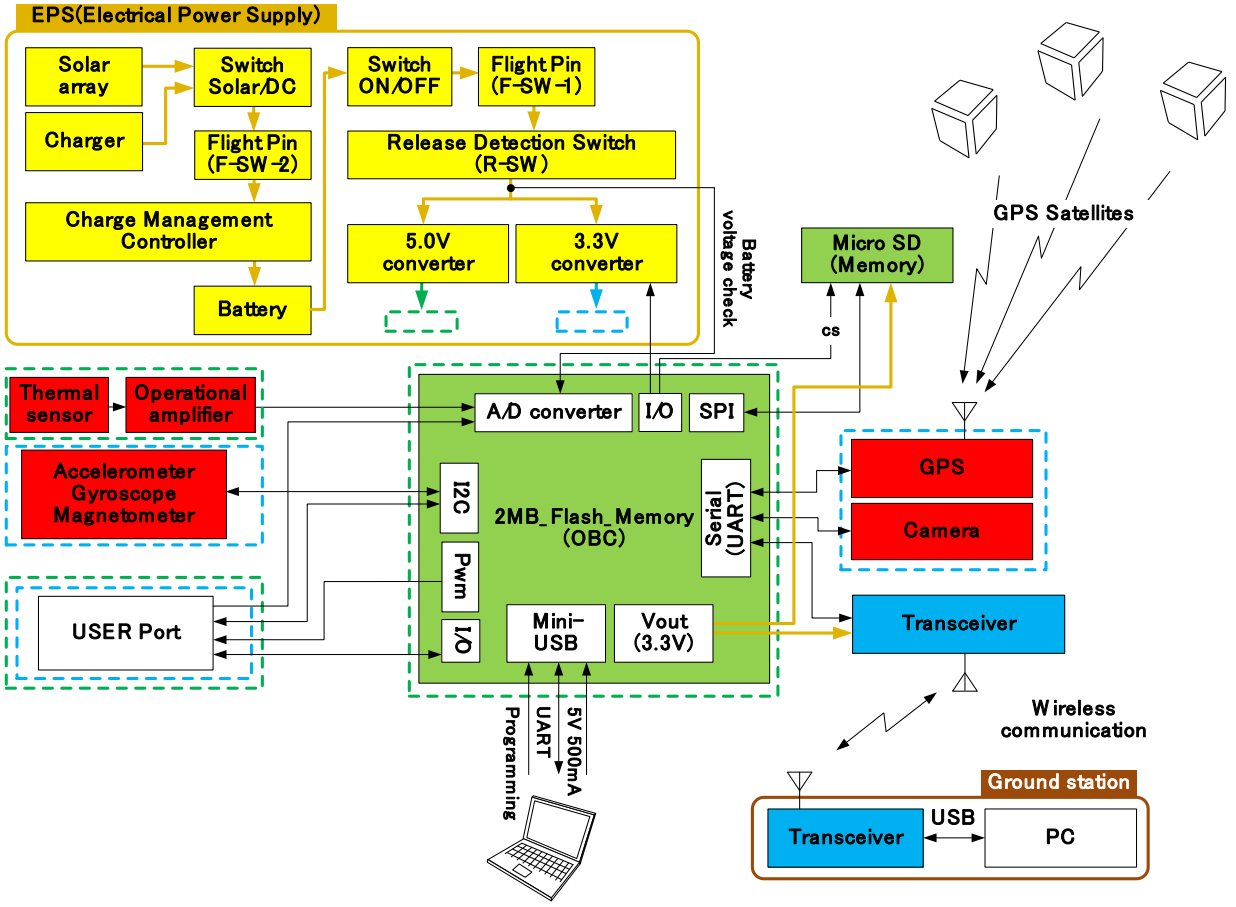
Minimum Success	Downlink of GPS and Magnetometer Data During the Mission
Full Success	Writing Magnetometer and GPS Data on SD Card
Extra Success	Downlink and Writing Magnetometer Measurements and IGRF Outputs.

Mission Requirements

Event	Requirement
Preparation Phase	Visual check
	Checking SD Card is installed.
Stand time phase	Battery voltage is 4.0 V or more
	The satellite is "ON".
Launch Phase	Downlink of GPS, Magnetometer, temperature and battery voltage.
Mission Phase	Starting mission with uplink command.
	Geting data from GPS, magnetometer, gyro and accelerometer data.
	Writing the data to the SD Card.
	Sending the data to ground station.
Analysis Phase	Reading GPS data from the SD Card.
	Calculation of magnetic field data with GPS data.
	Reading magnetometer data from the SD Card.
	Comparing both data

Bus System Architecture

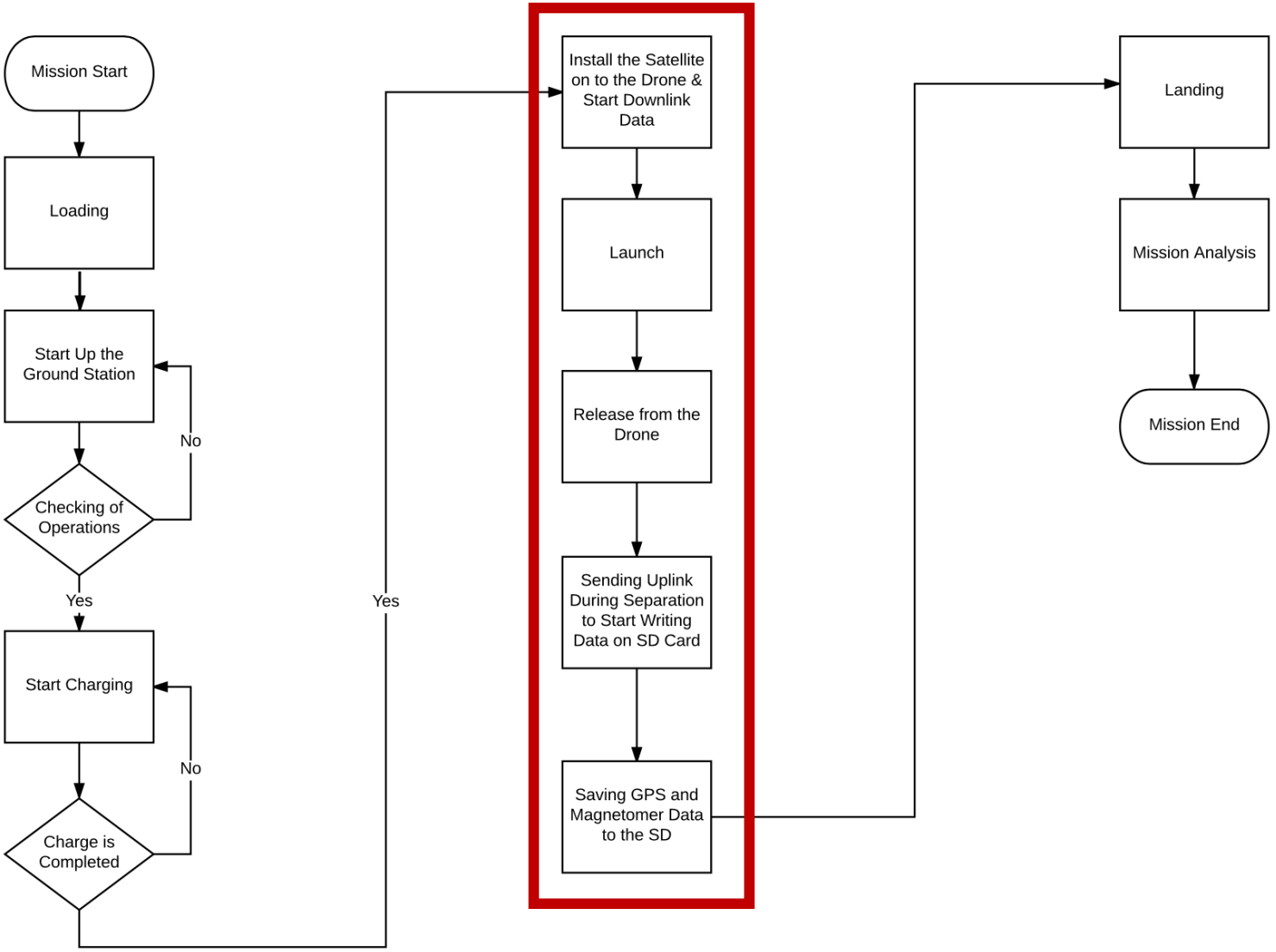
- For this mission, only magnetometer and GPS results are needed. So, only Heptasat system is used.



Validation and Verification Plan/Testing

- Testing communication (both uplink and downlink)
- Testing magnetometer
- Testing SD card data writing
- Testing GPS

Mission Sequence



Flight Result: First Attempt-Second Attempt

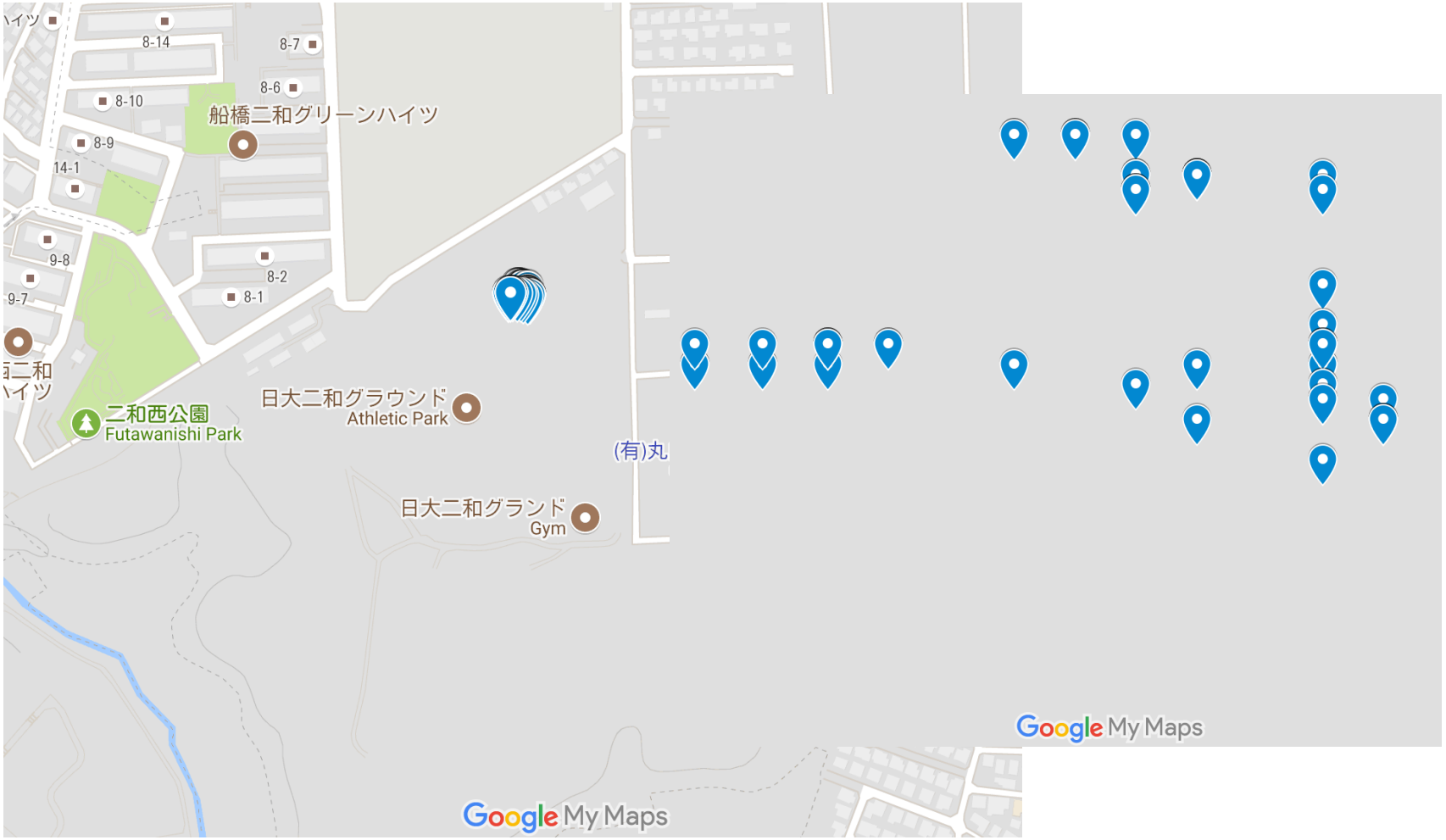
- In the first attempt
  - Communication problems,
    - successful uplink,
    - downlink interrupted,
  - Missing data/interrupted SD Card writing
- In the second attempt,
  - Successful communication,
    - successful downlink-uplink
  - Magnetometer, Gyro and accelerometer data is written on SD Card
  - No GPS information

Flight Result: Third Attempt

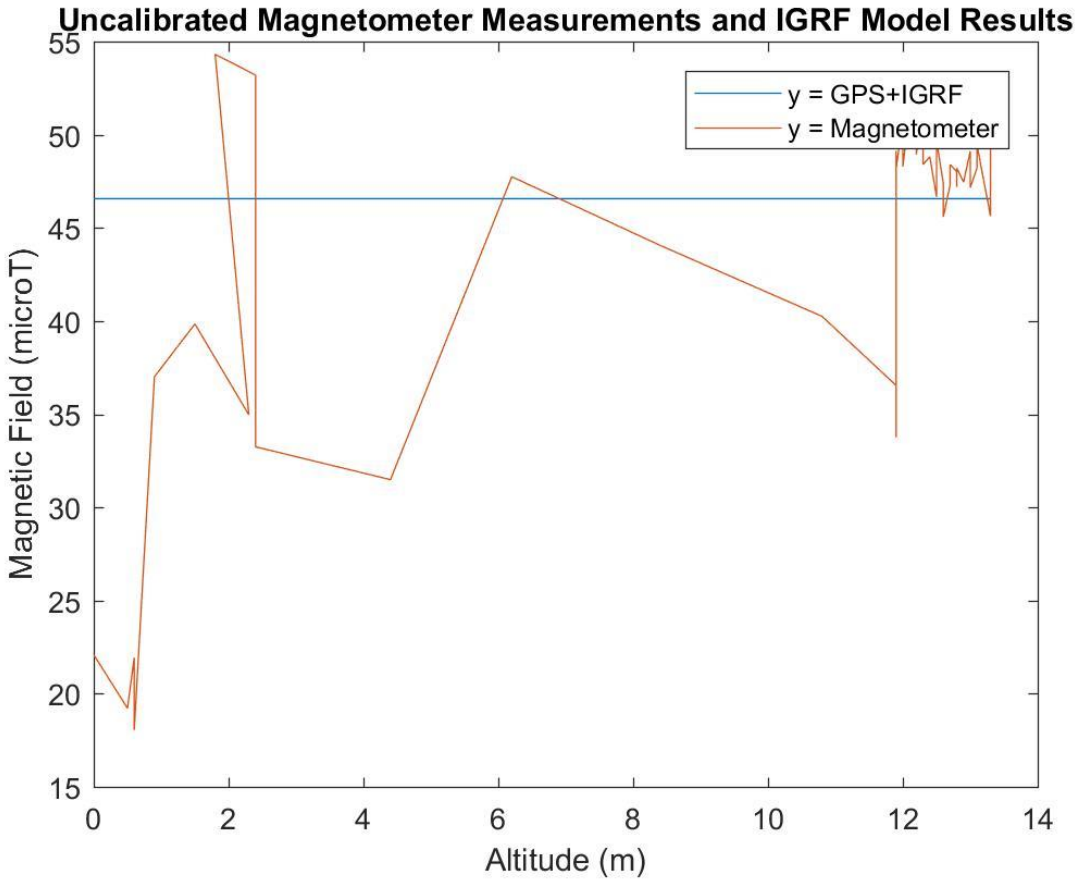
- Partial Success
- Only 13.3m of drop information is collected.
- Without attitude information, only the magnitude of magnetic field comparision is possible.

Third Attempt Video

Third Attempt: Results



Third Attempt: Results



Conclusions

- Minimum success criteria is met. However, medium success criteria not fully met. Due to missing data of beginning of the drop.
- Sensor measurements vary a lot. But,
  - Uncalibration
  - Satellite internal effects
  - Environment effects.

Recommendation and Future Work (Mission)

- Re-check the code, because of the GPS communication problem.
- Doing the same test,
  - With a deployable magnetometer outside of the satellite (Internal Effects)
  - Without lauch, in a Helmholz Cage (External Effects)