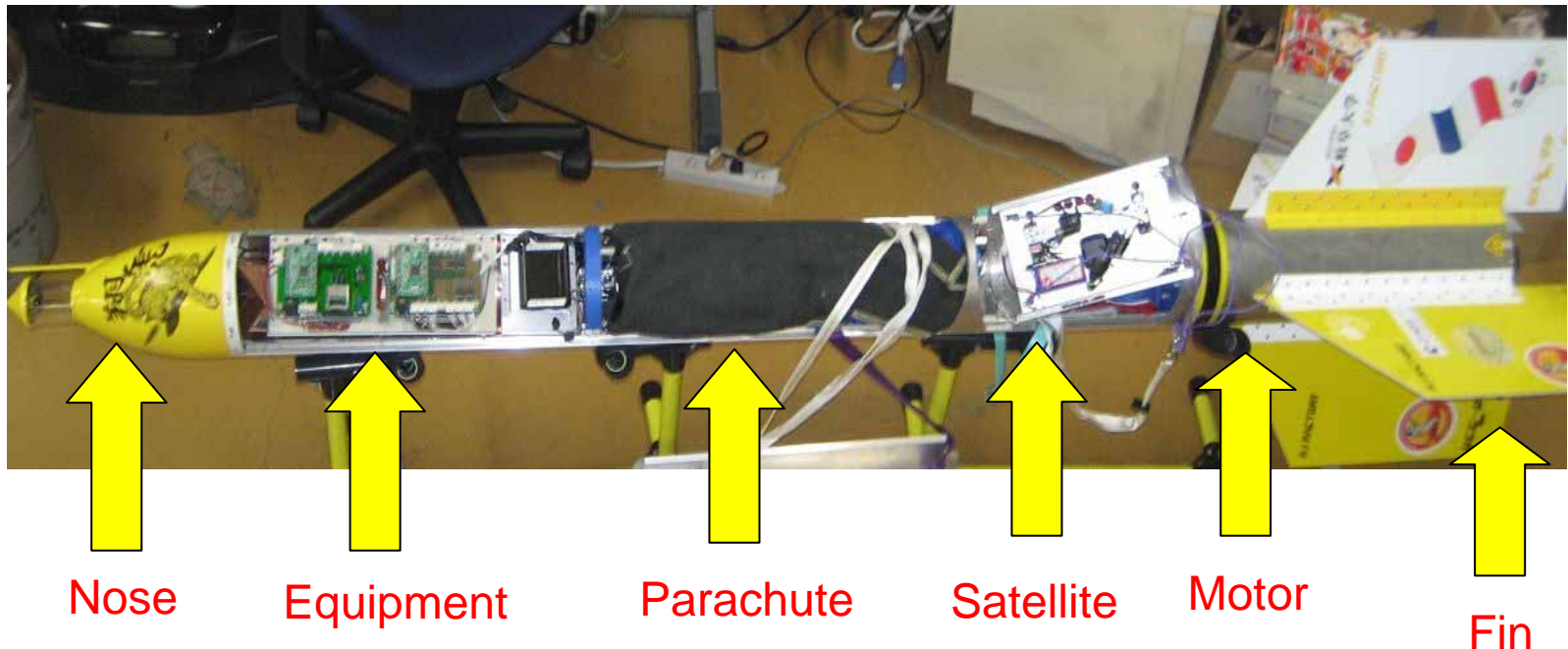# UCG-08 report

UCG Norio Ikedo

Purpose of the experiments

The purpose of our experimental rocket are as follows:

1. Two cameras monitor motor combustion and activity of the flying rocket.
2. Accelerometer, pressure sensor and GPS sensor is to compare with simulation data such as acceleration, velocity and position.
3. Quasi-satellite will come back autonomously to the target position using GPS data.
4. Get the skill and cooperation as the engineer who cannot get it only by studying at the desk.

The external view of UCG-08

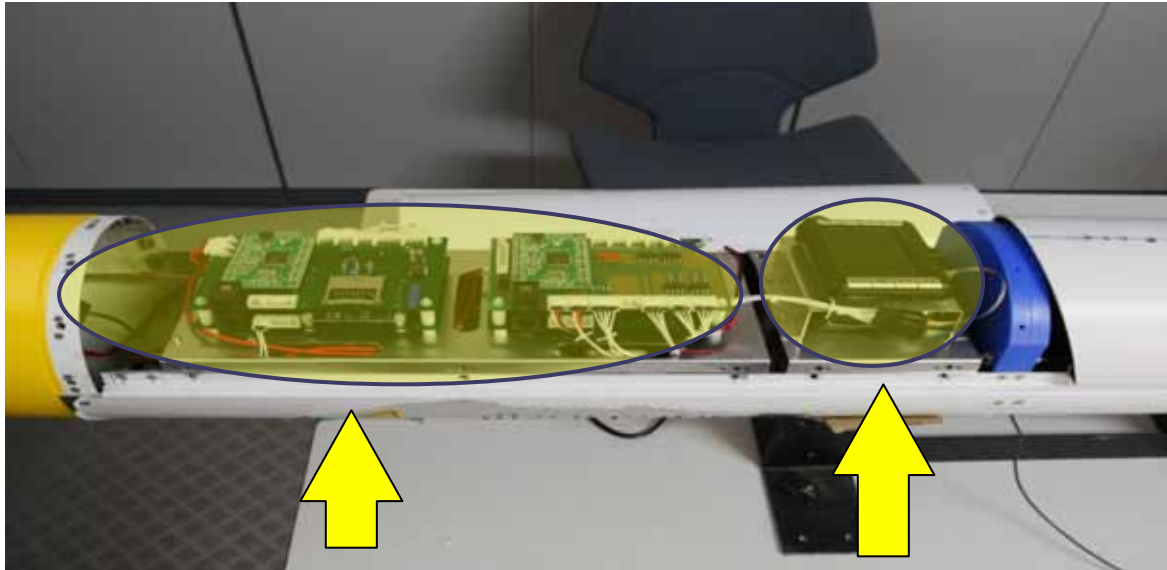Nose   Equipment   Parachute   Satellite   Motor   Fin

●nose:GFRP

●body:aluminum

●fin:composite materials

total length : 2.095m
total weight : 12kg

Introduce about equipment

Main control board
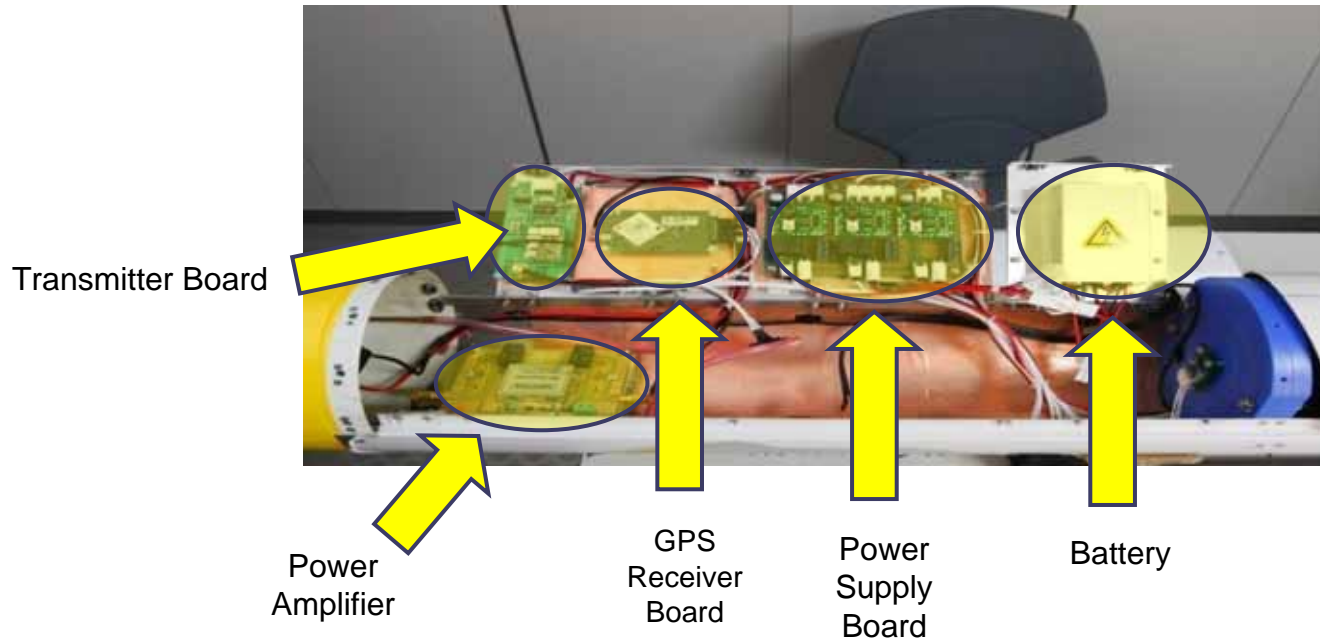&   Sensor board

Recording Device

About equipment, when the body is taken, coming into view of a Main control board ,a Sensor board, and two Recording devices.

The main control board does the main control of the rocket. (For example, launching of the rocket, opening of the parachute, and releasing of the satellite .)

The sensor board is installed an Accelerometer, a pressure sensor and a GPS sensor . Those sensors measure each data, and send the result to Main control board and record on some SD cards.

Recording devices record the image of omnidirectional camera and CCD(back) camera on each SD card.

Introduce about equipment

Transmitter Board

Power Amplifier

GPS Receiver Board

Power Supply Board

Battery

When turning it inside out, coming into view of a transmitter board, a power amplifier , a GPS receiver board, a power supply board , and three batteries

The Transmitter board sends the electric wave to inform of the position of the rocket. Moreover, the power amplifier is used to make the sent electric wave strong.

The GPS receiver acquires the location information of the rocket, and sends data to the main control device and the ground. It is useful for searching of the rocket.

The power supply board supplies the electrical energy sent from the battery to each board. Each board needs different voltage. So it is necessary to control voltage with the power supply board.
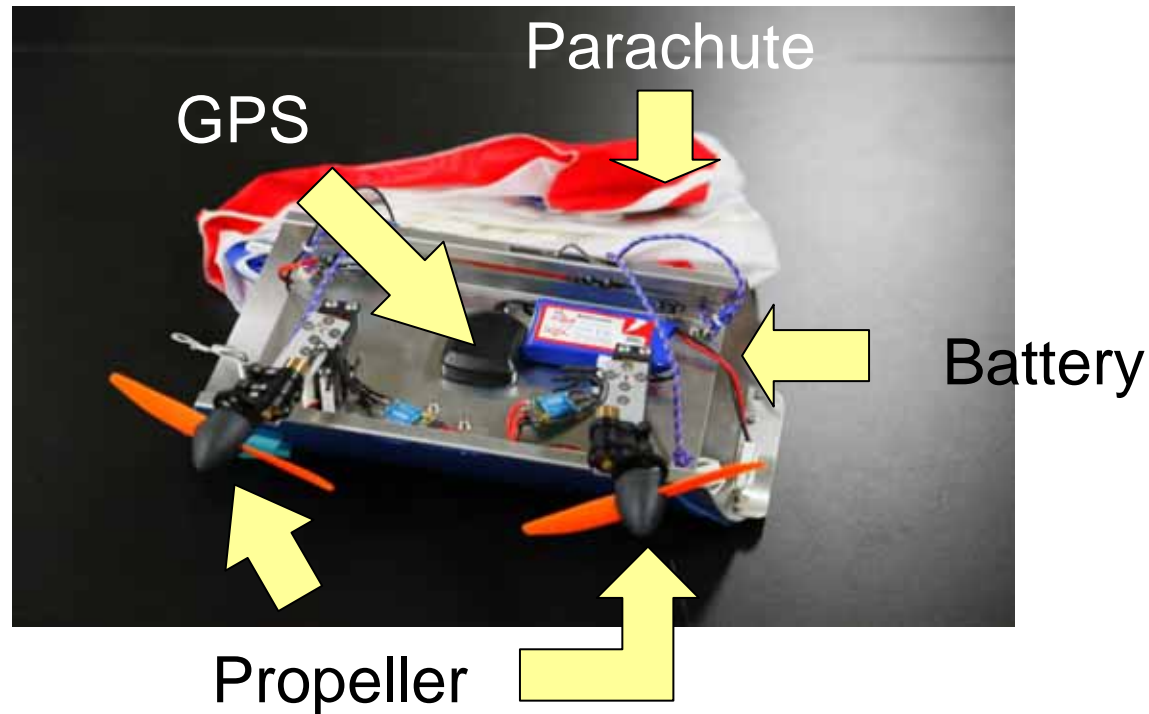
About omnidirectional camera

.It 's installed at top of the nose corn.

.Surrounding scenery is reflected to omnidirectional mirror in the cylinder, and it takes a picture of the image from the camera upward installed.
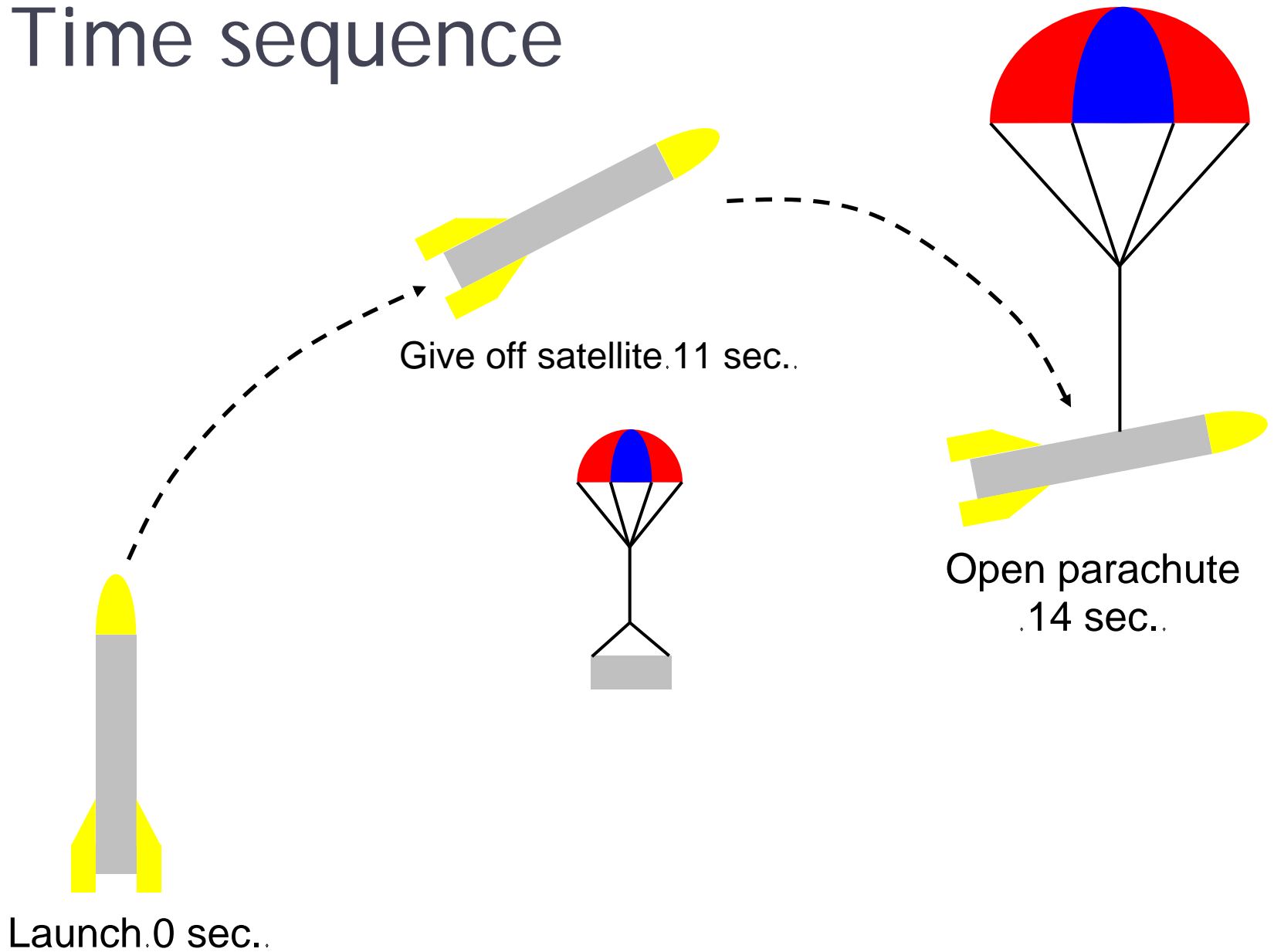
Quasi-satellite

This is quasi-satellite. It has two propellers, one battery, GPS sensor and parachute. And a beacon and a SD card are installed in the backside.
It is controlled by PIC.
A quasi-satellite that autonomously come back to the target point has been developed.

Time sequence

Give off satellite. 11 sec.

Open parachute
.14 sec.

Launch. 0 sec.

Result of UCG-08

On rocket

- Getting accelerometer data : success
- Getting pressure sensor data : success
- Getting GPS data : fail
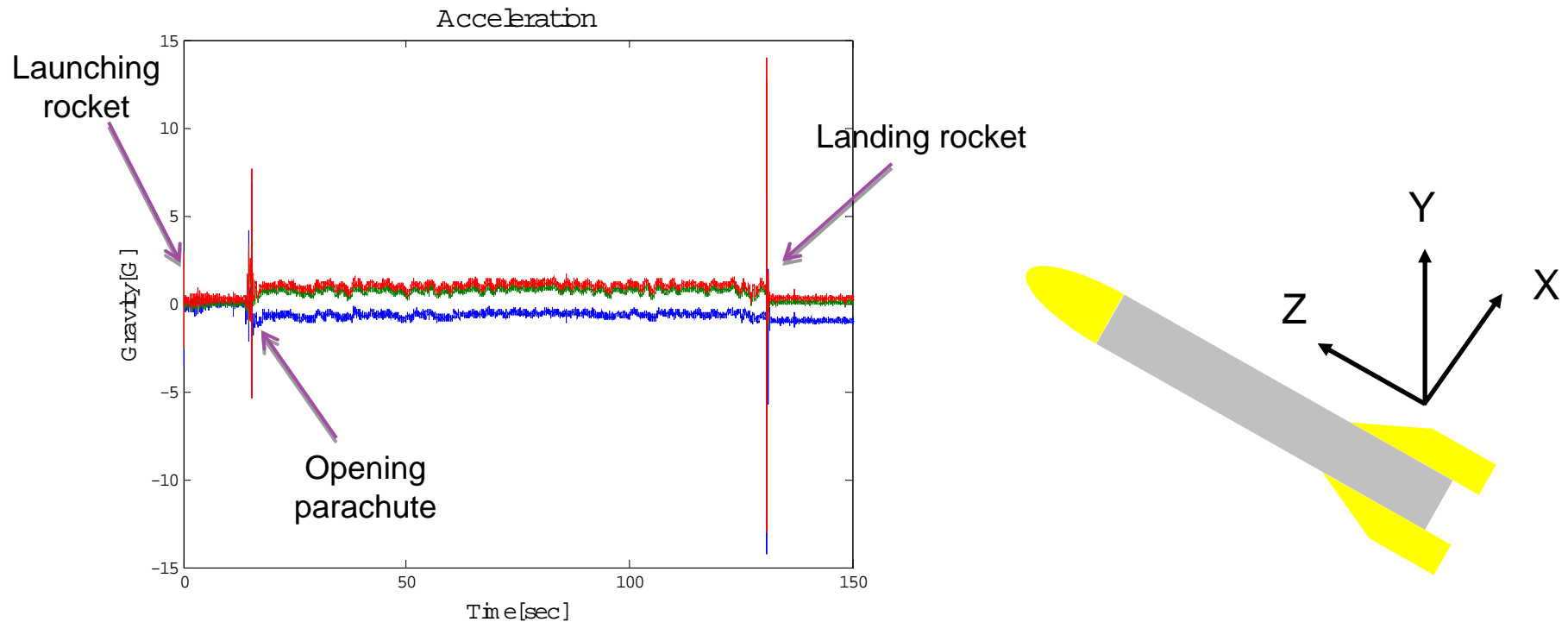- Getting two camera's movie : success

On quasi-satellite

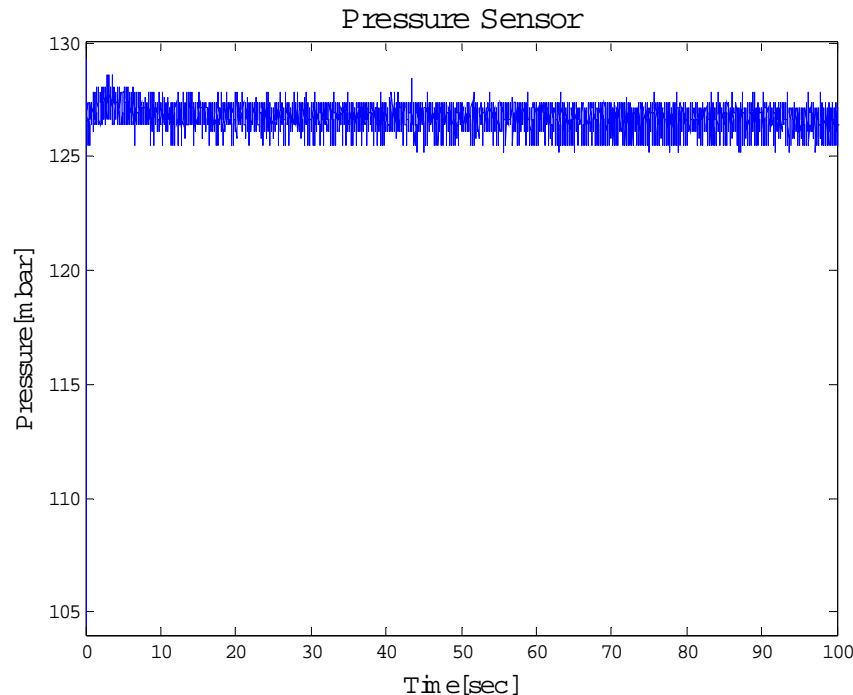- Getting GPS data : success

Why wasn't GPS data got ?

PIC program had to be rewritten before lift off, but we forgot to do it.

Explanation of result (acc sensor)

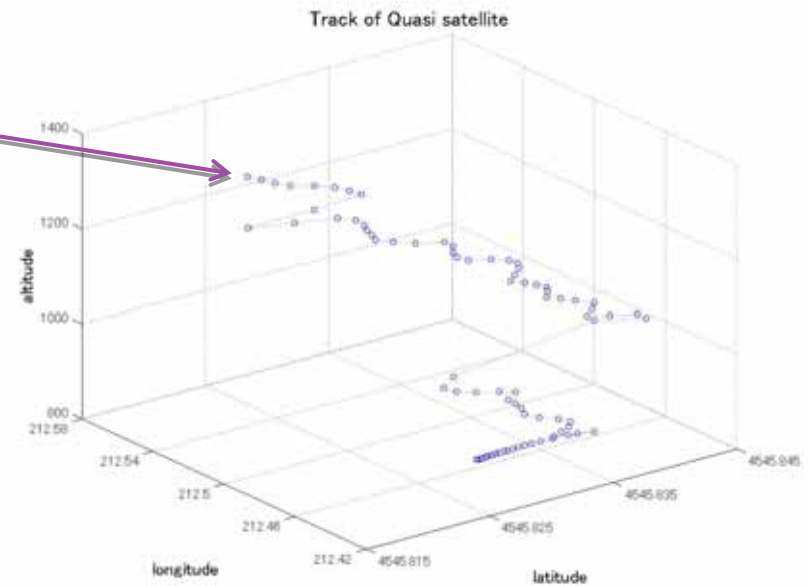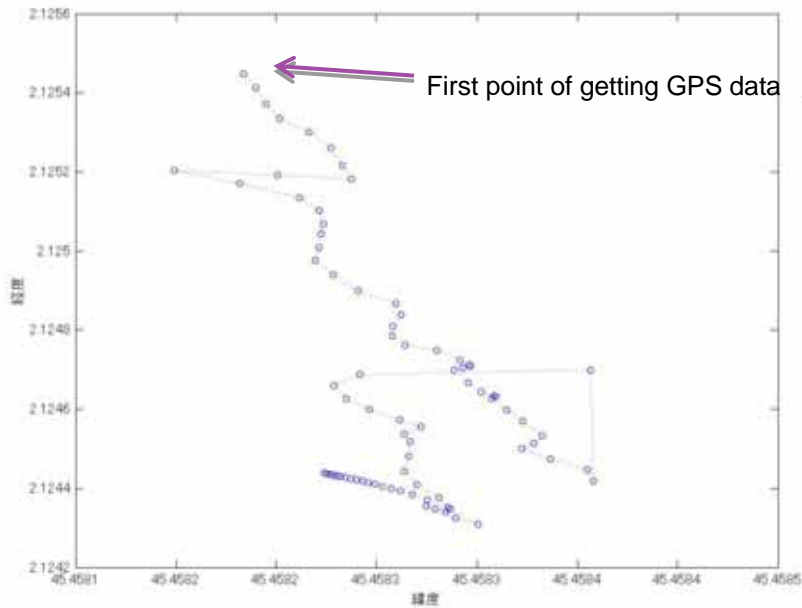You can see time of launching, opening parachute, and landing rocket .

Explanation of result (pressure sensor)

Pressure sensor data was written on SD card. But, this data is strange. Because, pressure must be changed by launching , speed down for opening parachute , and so on. Check this graph. Pressure had not changed .
It is thought that it is because the voltage adjustment device had moved by the impact of the launching.

Explanation of result (Satellite GPS sensor)

First point of getting GPS data

Track of Quasi satellite

GPS data was influenced by number of GPS satellites. So, a big change is done to these GPS data.

Rocket's flying movie (bottom camera)

Launching

Flying

Landing

Rocket's flying movie (omnidirectional camera)

Launching

Flying

Landing

Conclusion

- Quasi−satellite couldn't be controlled that we wanted to. So, we have to change the system of it on next year.
- Next year, it is necessary to modify the method of measuring pressure.