UCG-10 report

Purpose of UCG10

- Autonomous landing of the quasi-satellite at a target point by GPS sensor.
- The rocket will be recovered as intact as possible.
- Getting dates of each sensors (Accelerometer, pressure sensor and GPS sensor).

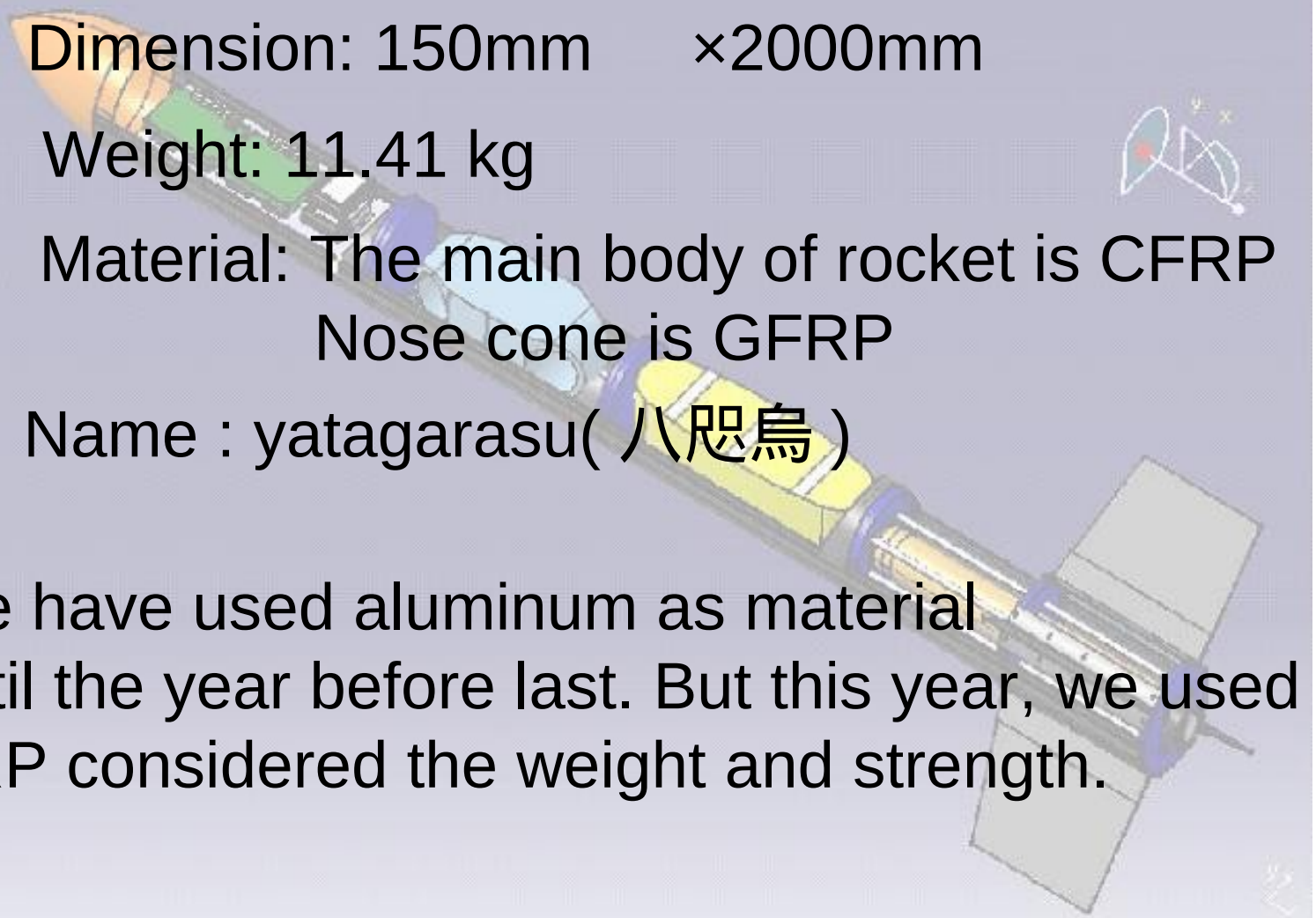
Specification

Dimension: 150mm ×2000mm

Weight: 11.41 kg

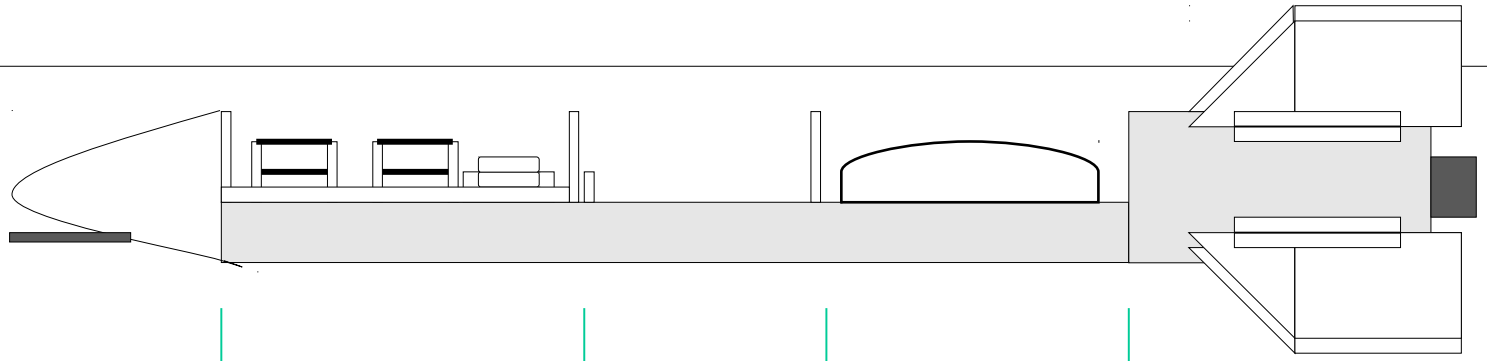
Material: The main body of rocket is CFRP
Nose cone is GFRP

Name : yatagarasu(八咫烏)



- We have used aluminum as material until the year before last. But this year, we used CFRP considered the weight and strength.

Configuration of UCG10 Rocket



- Nose
  Motor Bay
- Electrical
  Equipment Bay
- Satellite Bay
- Parachute Bay
- Rocket

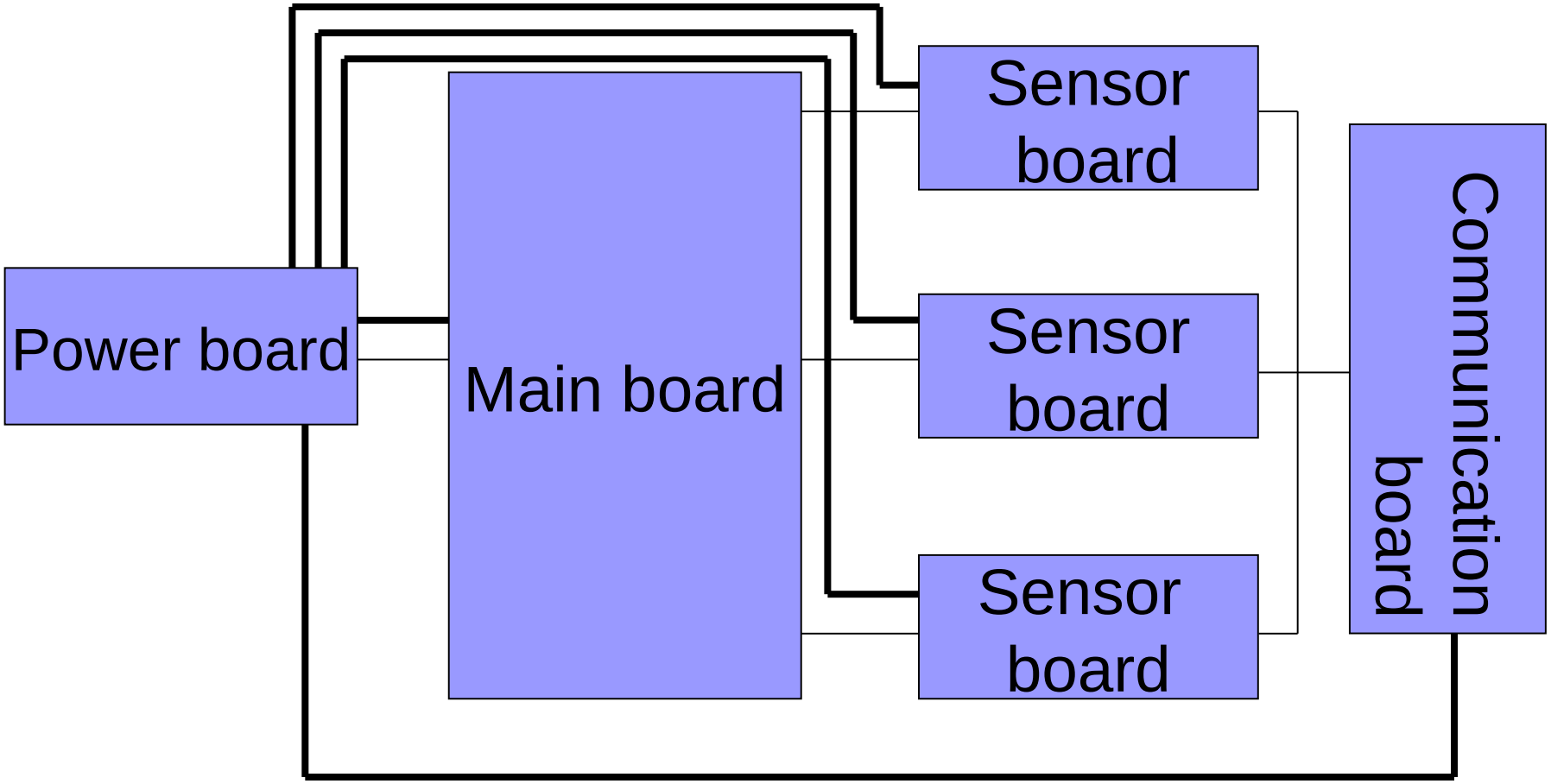
- Pitot tube
- electronic circuit
  - battery
  - video recorder
  - GPS
  - acceleration sensor
  - pressure sensor
  - gyro sensor
- quasi-satellite
- Parachute
- Rocket motor

200mm | 470mm | 400mm | 420mm | 510mm

2000mm

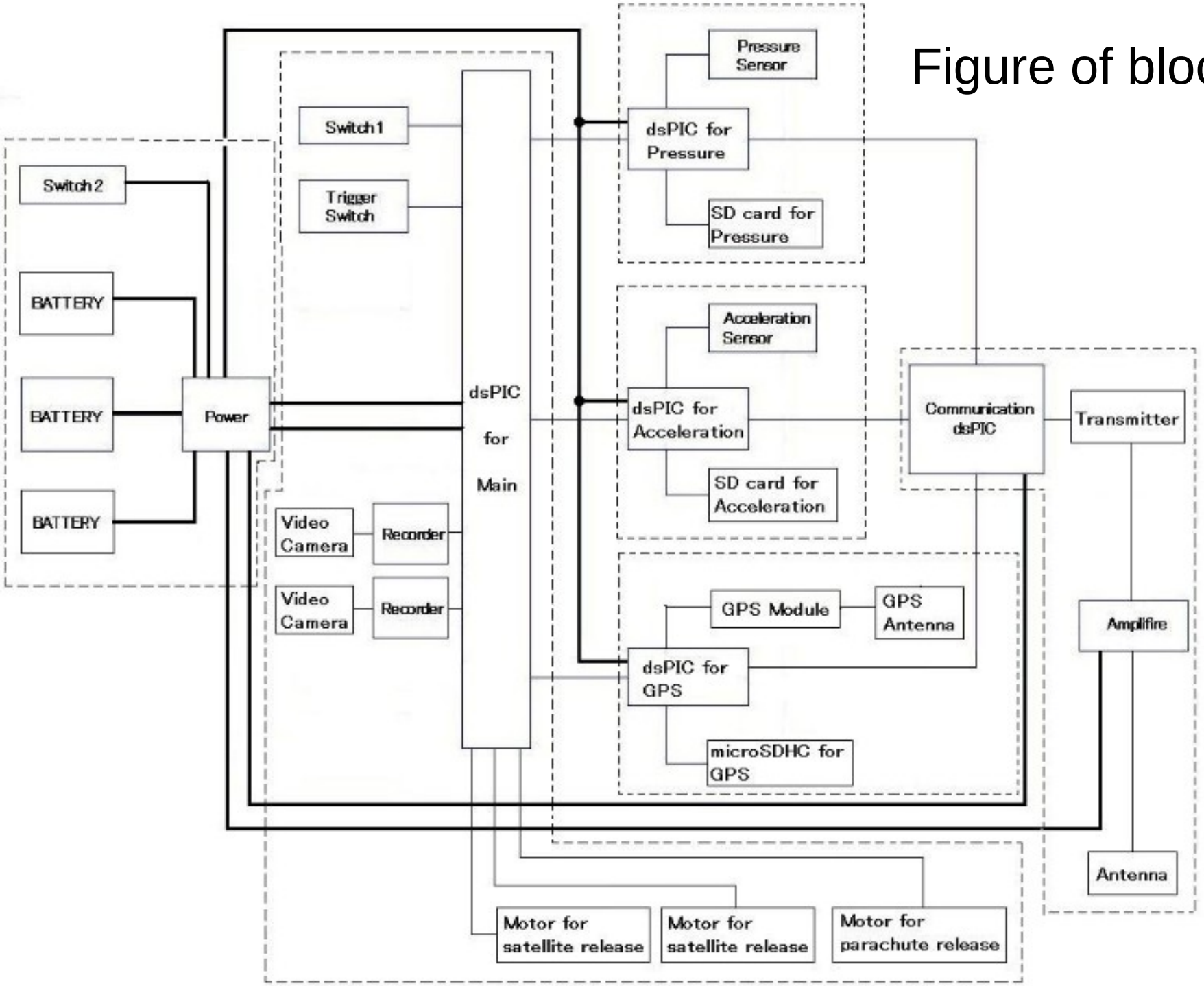
Picture of the rocket

Structure of electric circuit

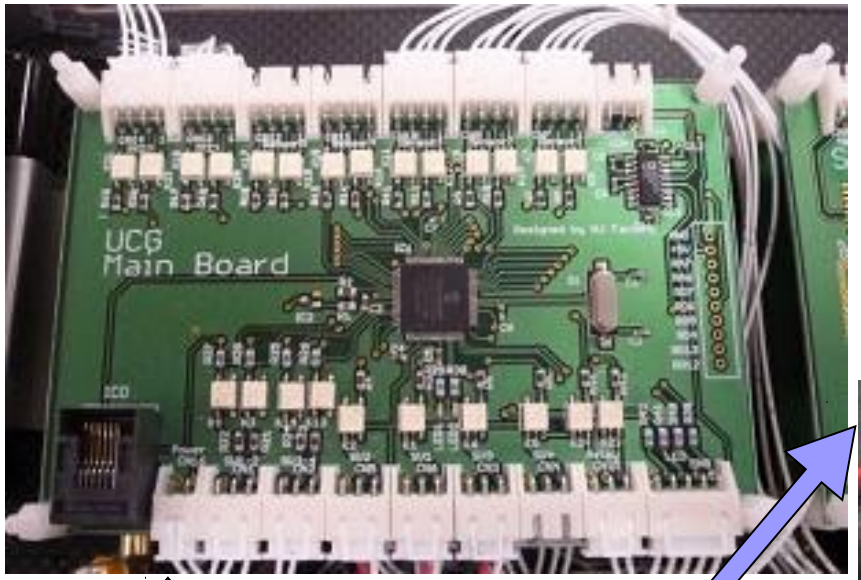


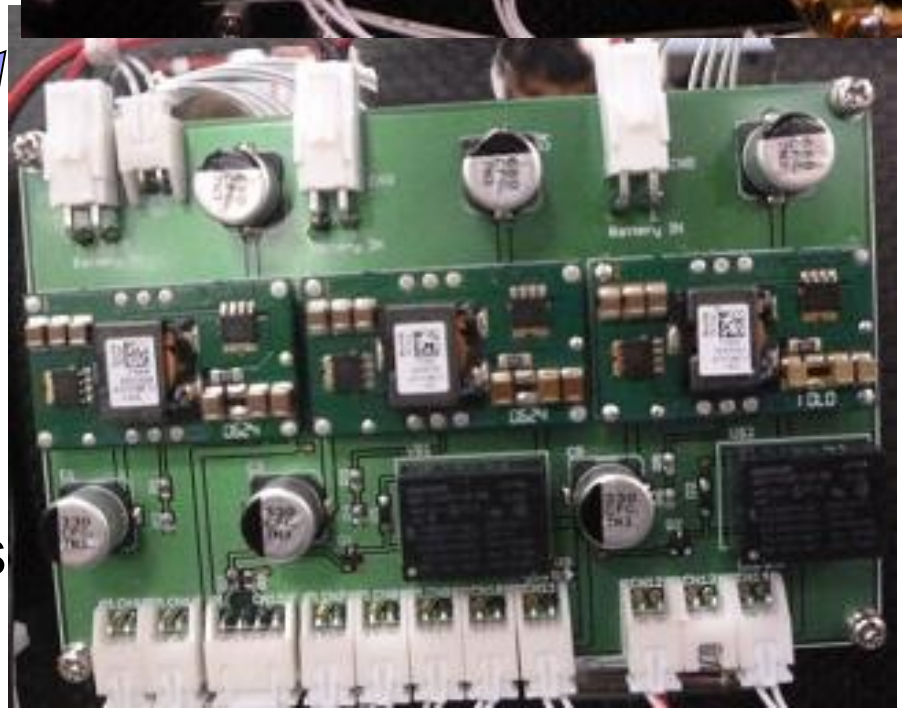
We develop a new structure which use communication board.
Communication board has transmitter which sends dates to receiver placed on the ground.

Figure of block



Pictures of circuits.





Main board

Communication board

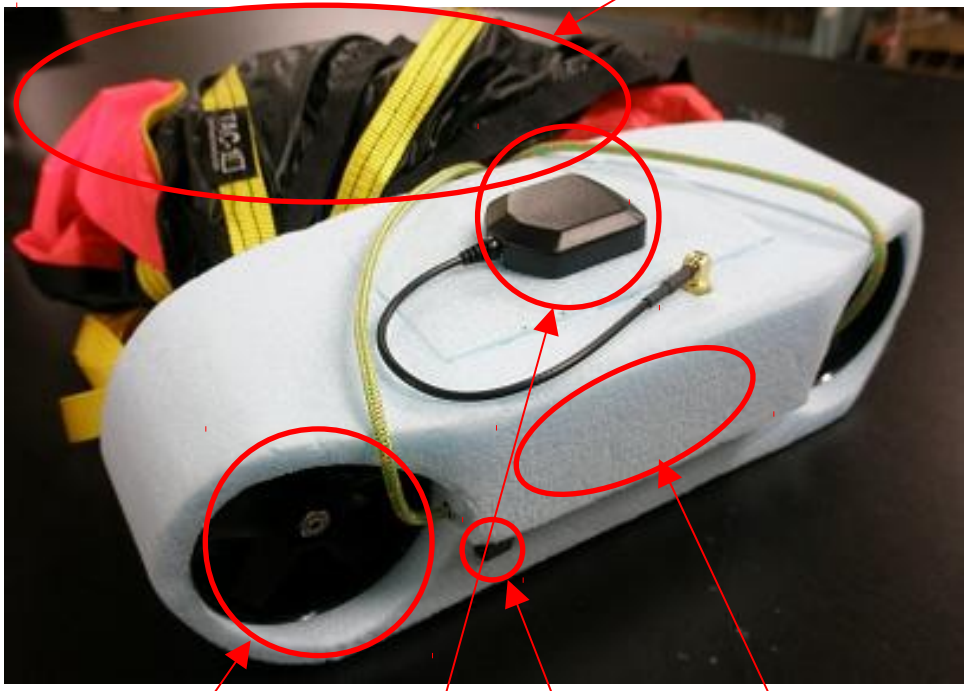
Power board

※We made three sensor boards although there is no picture.

Quasi-satellite

- The quasi-satellite will be released from a rocket and moving to the target point by GPS dates.
- The quasi-satellite has two ducted fan and a parachute.

Quasi-satellite



The outside of quasi-satellite

Specification

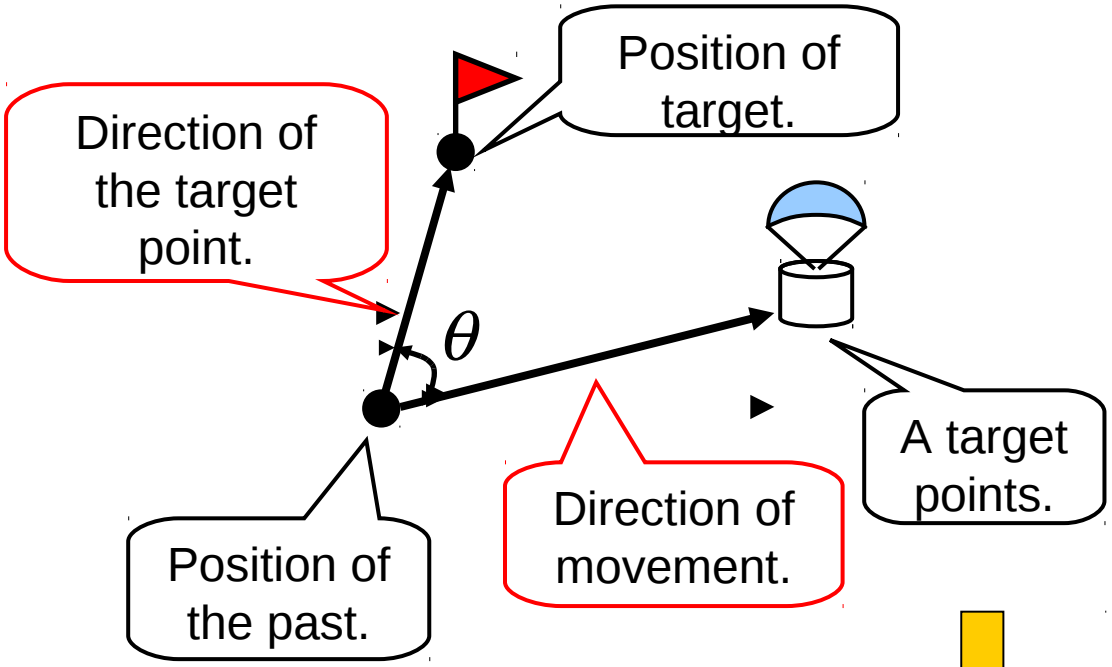
Height ： 90mm
Width ： 300mm
Depth ： 120mm
Weight ： 600g
Material ： styrofoam

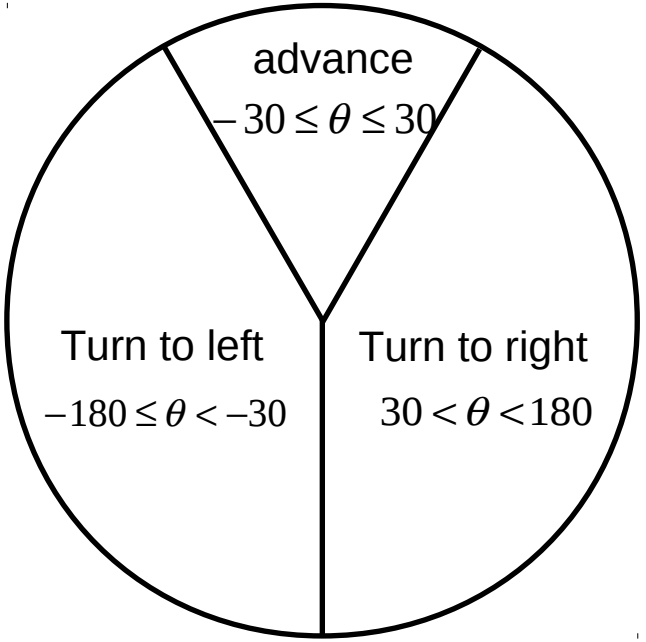
Installation

- GPS
- Camera
- Ducted Fan ×2
- Parachute
- Li-Po battery
- Electric circuit

Li-Po battery and electric circuit is in the body.

Control of moving





It decides moving by an angle θ

Result of UCG-10

On rocket

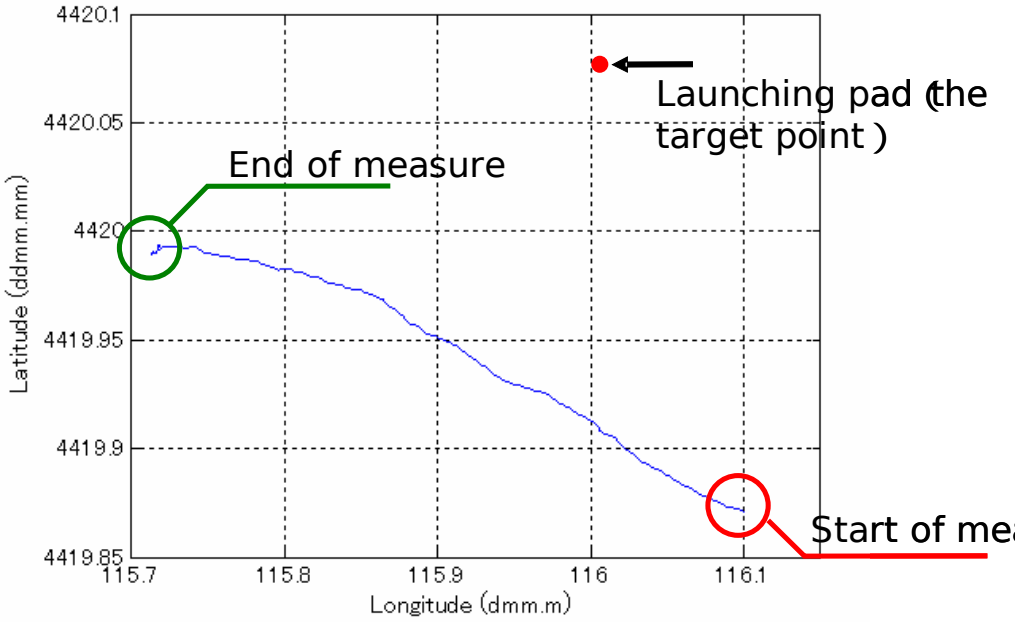
- Getting accelerometer date : success
- Getting pressure sensor date : fail
- Getting GPS date : success
- Getting two camera's movie : success

- Getting GPS date : success

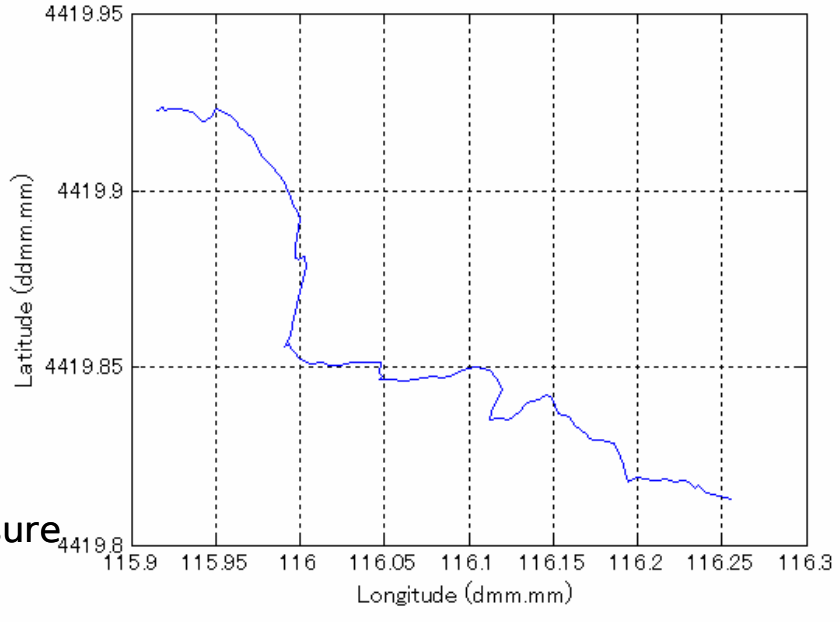
On quasi-satellite

We could not get pressure sensor date
due to mistake of plugging.

Results of the GPS data

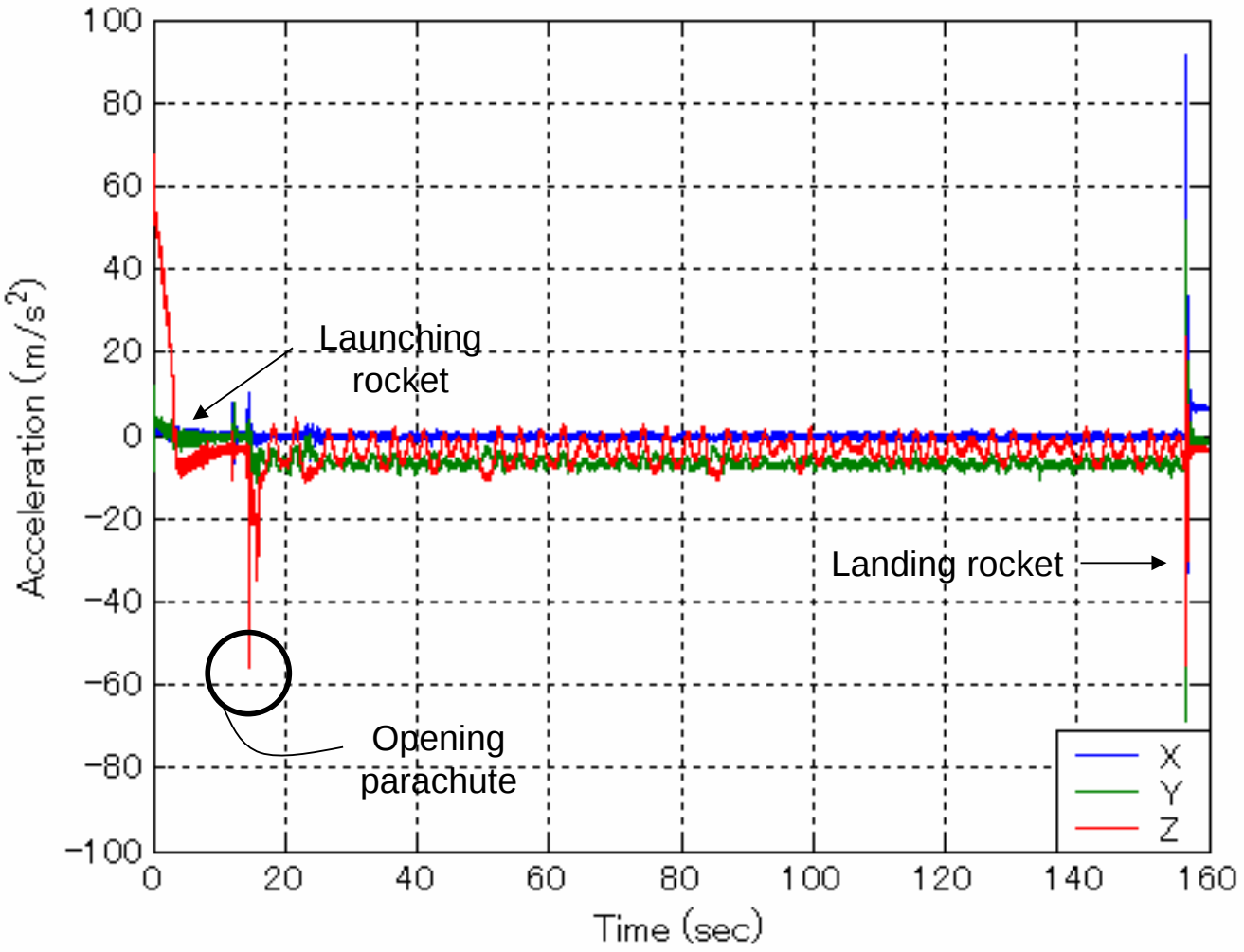


Satellite's GPS data(2 dimension)



Rocket's GPS data

Result of accelerator



Conclusion

- The rocket was recovered intact.
- The quasi-satellite could not move to the target point because of the strong winds. It is necessary to substitute a parafoil for a parachute.