

# TOHOKU UNIVERSITY FROM THE EARTH Hybrid Rocket & Can-Sat Project



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Boeing Higher Education Program Annual Report

## 1 Introduction

### What's FTE?

Our club has about 60 members. Our basic principals are to reach the atmosphere and to impress everyone. We develop CanSats and rockets to realize our basic principles.

### COVID-19

Our club activity almost stopped during spring because of COVID-19. Our activity partially allowed in summer, but it was too hard for us to make rockets and CanSats. In addition, volunteer activity to impress everyone is not allowed still now.

### Noshiro Space Event

The restriction was gradually relaxed and we try hard to make rockets and Cansats. We participated in an amateur rocket launching event which was held in Noshiro city, Akita prefecture every summer. The event was postponed to November 21-23 in this year.



Figure 2. activity under restriction



Figure 1. volunteer activity

## 2 FTE-09

### Objective

1. Development of multi-stage hybrid rocket
2. Validation of new simulation program
3. Enhancing strength with CFRP(Carbon Fiber Reinforced Plastics)

### Result

We couldn't get enough engine on account of COVID-19. The plan is to use Type-L hybrid engine and Type-G solid engine but, we use only Type-K hybrid engine. We changed the design for the rocket for single-stage (Figure 3).

Our launch was canceled because it was windy, and we had some trouble with electrical equipment.

### Next plan

We improve this rocket and try to launch it in the next chance.

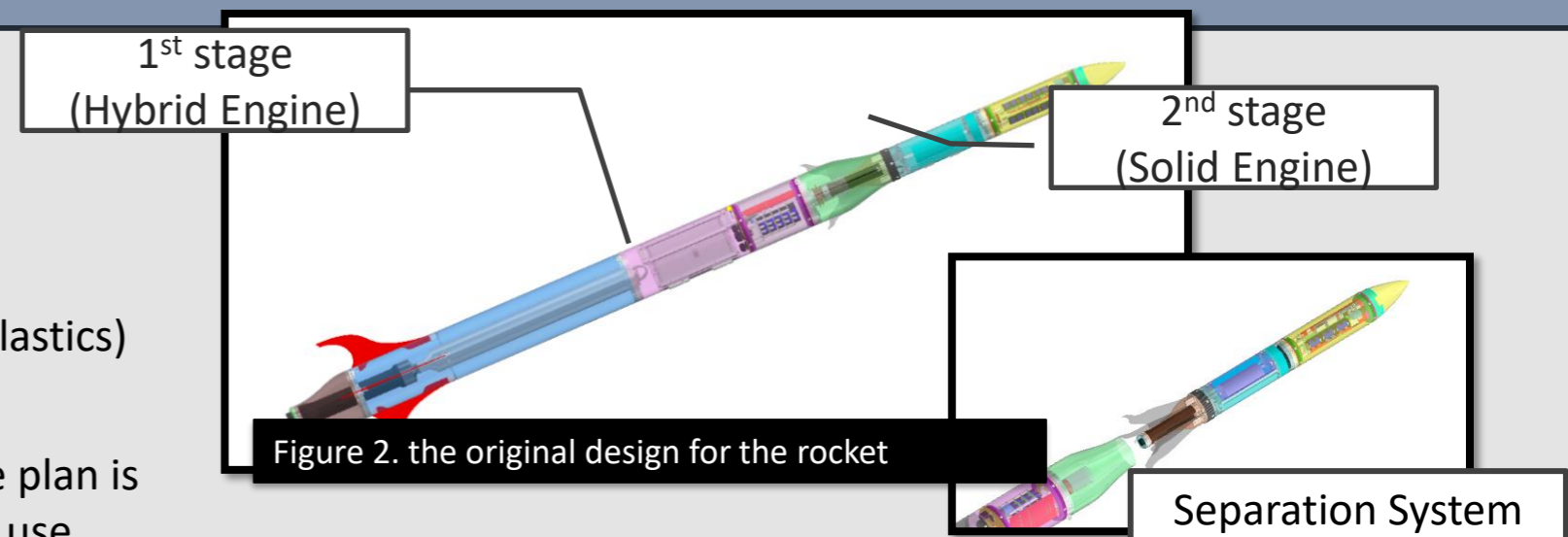


Figure 2. the original design for the rocket



Figure 3. FTE-09(single-stage)

## 3 Himawari

### Objective

Improvement of technical capabilities of sophomores

### Result

This rocket was successfully launched on November 22<sup>nd</sup> at Noshiro Space Event.

Because of the failure of the recovery system, however, the rocket was destroyed by the impact of splashdown to the sea and we failed to obtain the flight data. We only salvaged engine parts from the sea.

### Next plan

We will do our best to find the cause of the accident and develop a new rocket for the next chance of launch.

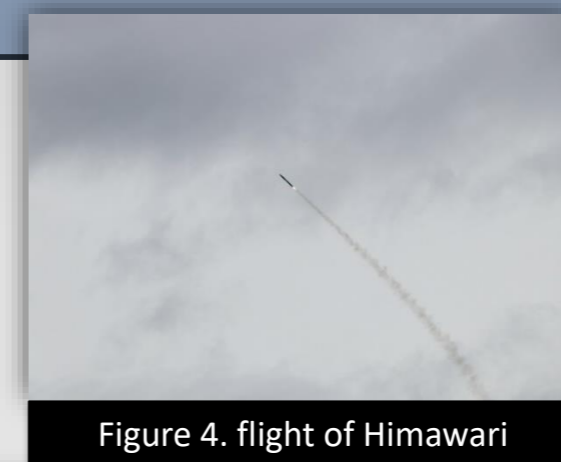


Figure 4. flight of Himawari

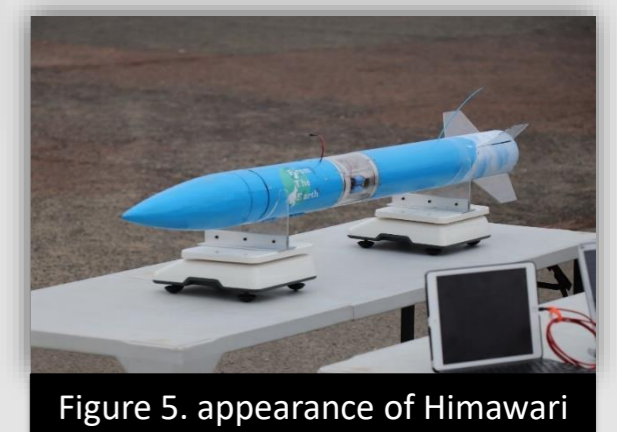


Figure 5. appearance of Himawari



Figure 6. destroyed part

## 4 CanSat

### Objective

1. Running back to the goal
2. Putting the extension unit on the field as observer

### Result

We dropped our CanSat from the air baroon in Noshiro on November 22<sup>nd</sup>. We dropped it twice, but Our CanSat did not work both times. It was because the software did not work well when SSH session (connection between Cansat and PC) was disconnected.

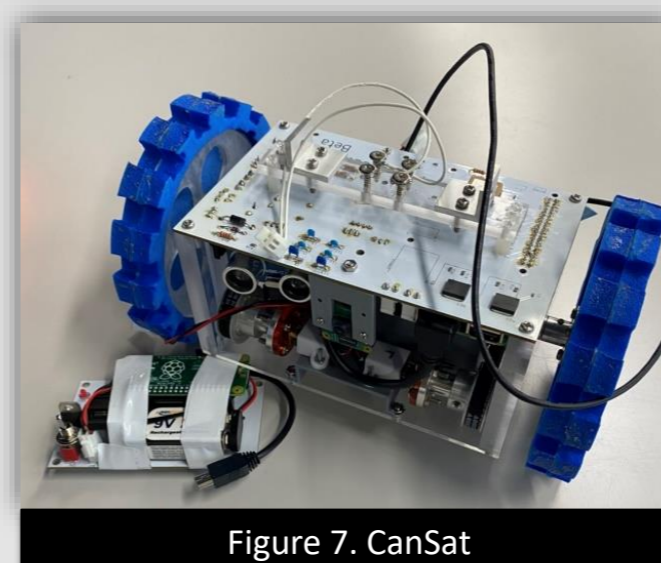


Figure 7. CanSat

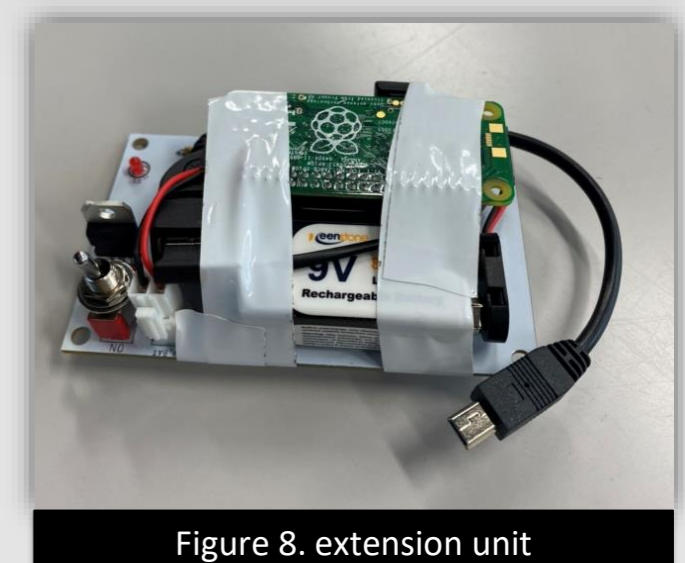


Figure 8. extension unit

