FROM THE EARTH
Boeing Higher Education Program
Year Performance Report

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About us

Members : 118

Our Vision: More higher

Impress everyone

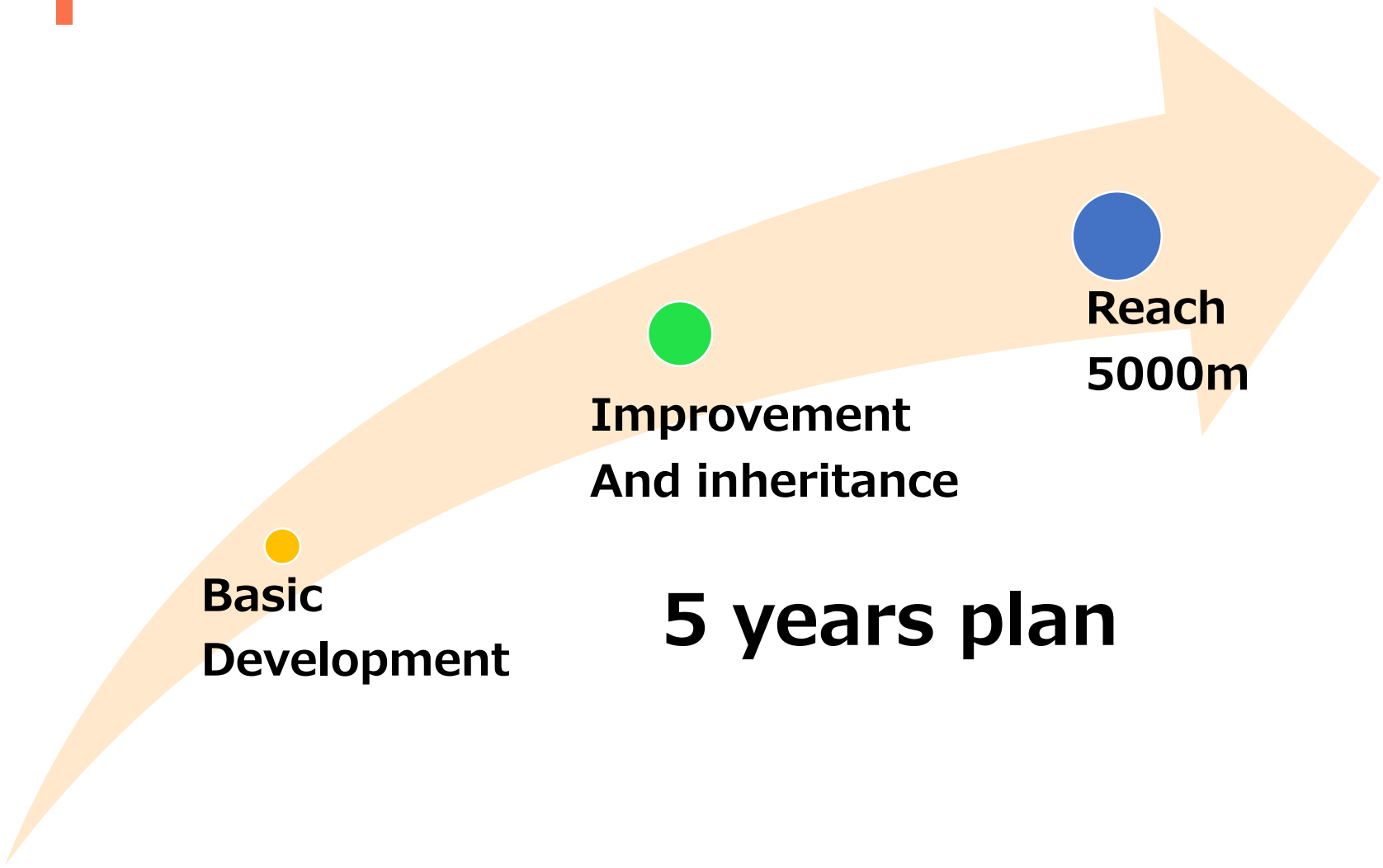
More higher → Rocket and CanSat development → Students growth

Impress everyone → Educational activities → Nurturing the next generations

Educational activities

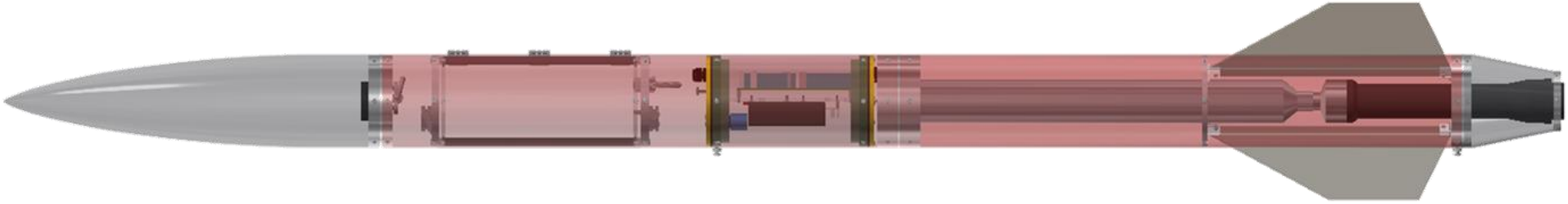
Being held approximately 12 times a year in cooperation with local elementary schools. Our goal is to convey the joy of science to children

Tohoku Type-M Rocket Project



Polaris (IZU Oshima Rocket Experiment)

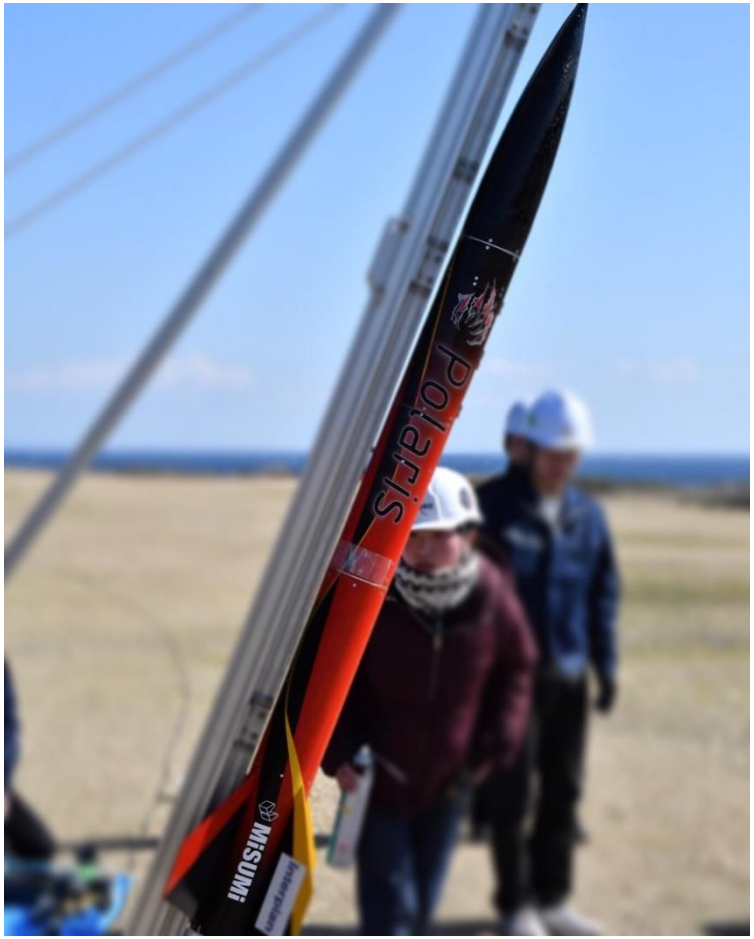
NAME	TMR-00 Polaris
Length	1915 mm
Diameter	116 mm
Weight	7.049 kg
Expected altitude	781 m
Engine	HyperTEK K240 (835cc)
Maximum speed	116 m/s



Launch purpose

1. Establishment of parachute release mechanism
2. External power supply by flight pins
3. Establishment of waterproof structure
4. Improved aerodynamic performance

Result



・Launch in izu-oshima island (Tokyo)

・The parachute was successfully released

・Almost achieved the purpose and served as a prototype for the TMR project

・Max Altitude :658m

・We are the only team that achieved successful launch in other participating teams

Shaula(Noshiro Space Event August)

	TMR-01 Shaula
Length	2220 mm
Diameter	116 mm
Weight	8.845 kg
Expected altitude	1655 m
Engine	HyperTEK L350（1650cc)
Maximum speed	190 m/s

Launch purpose

1. Development of leafing

2. Use of L-Type engine

3. Improved aerodynamic performance

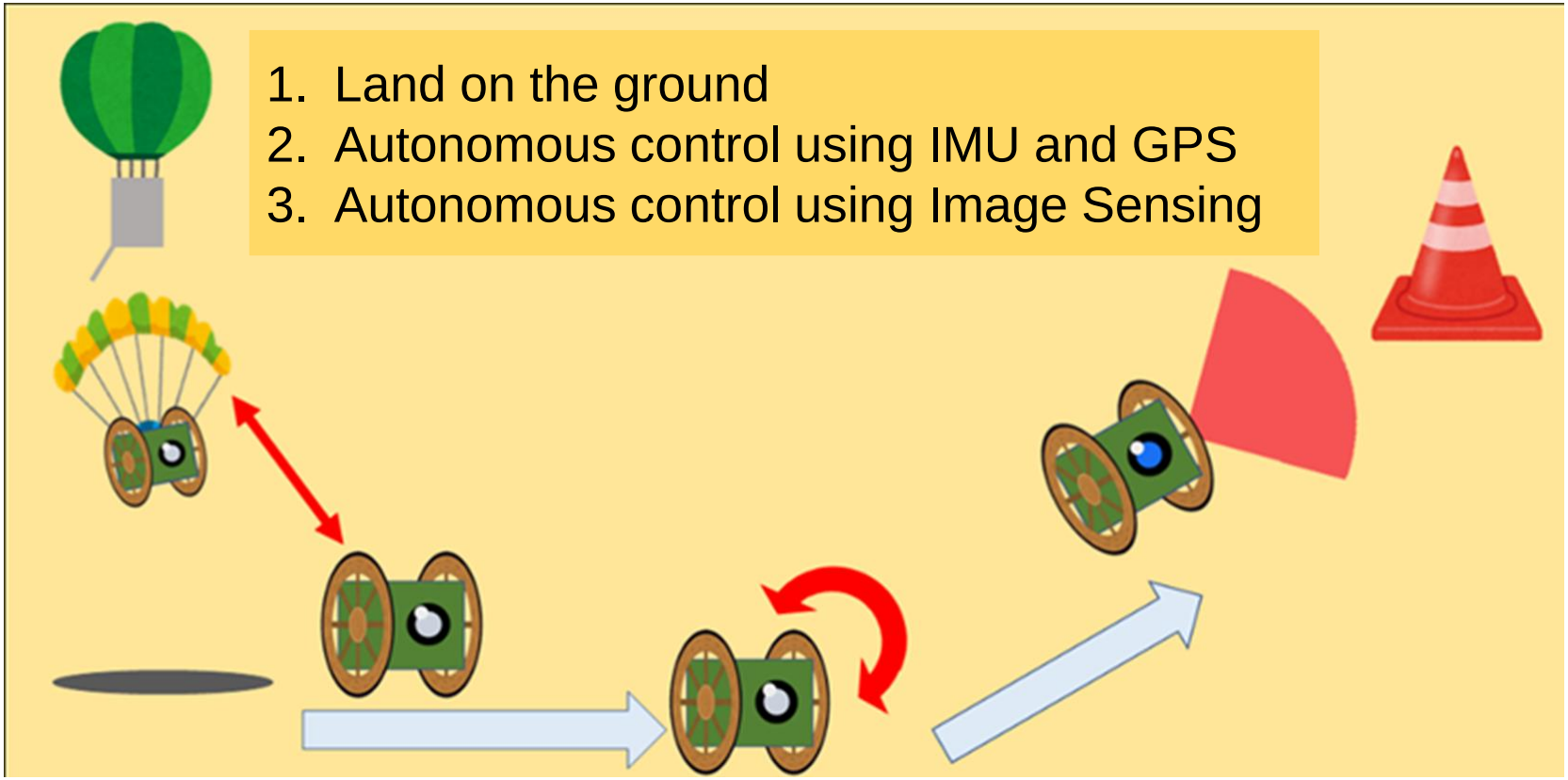
Result

- Launch in Noshiro-shi (Akita)
- couldn't confirm if the leafing was working
- Successful performance improvement from Polaris
- Height:1608m
- Set the highest record for our group
- We also found a place to improve on the next rocket

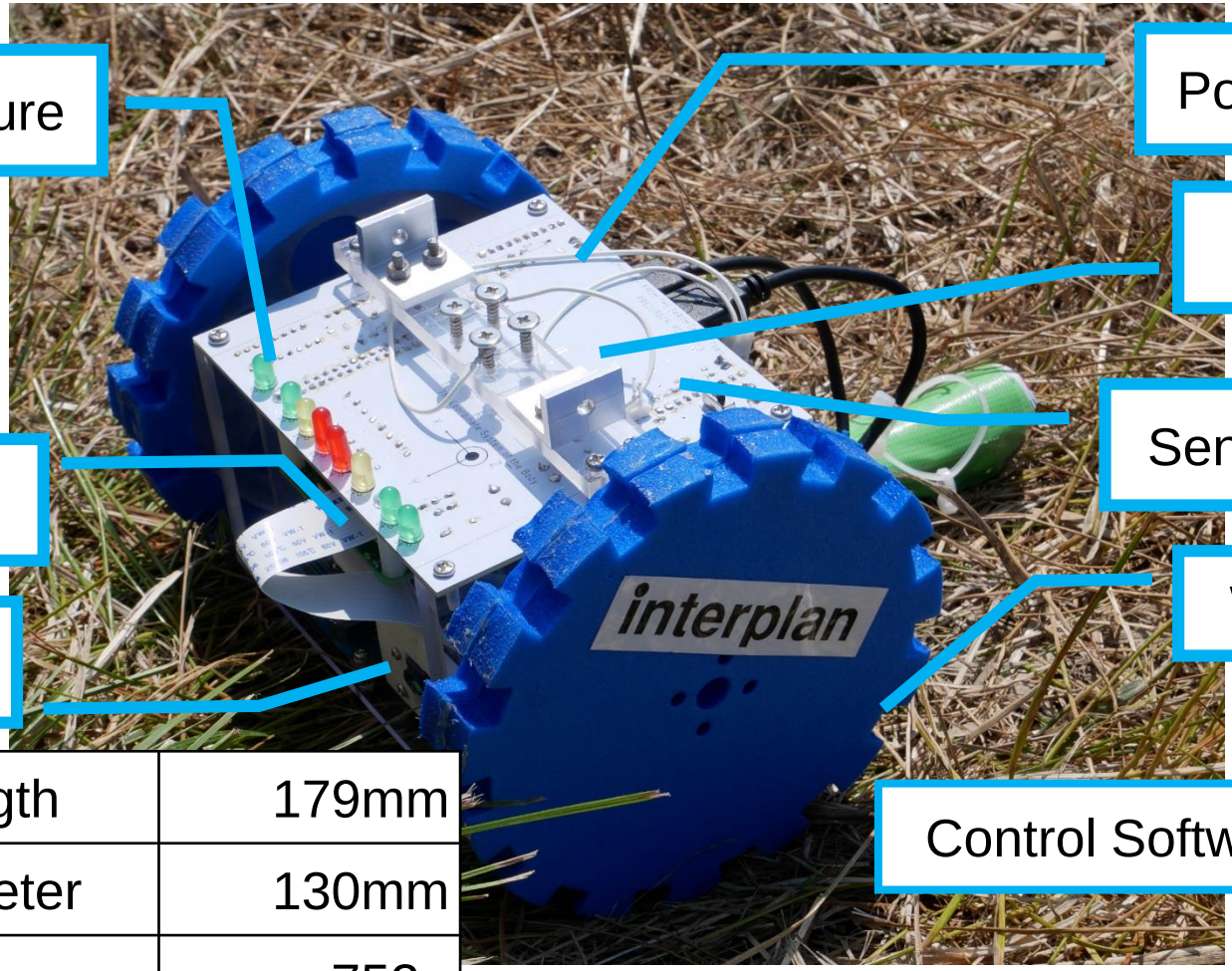
CanSat project

CanSat: small satellite model for understanding of space tech

Come back competition: land on the field and automatically run to reach a certain position (planetary exploration)



Specification of our CanSat



Structure

Power IC

SBC

COMM Device

Sensor・GPS

Camera

Wheel

Control Software

Length	179mm
diameter	130mm
Total mass	752g

Field Test

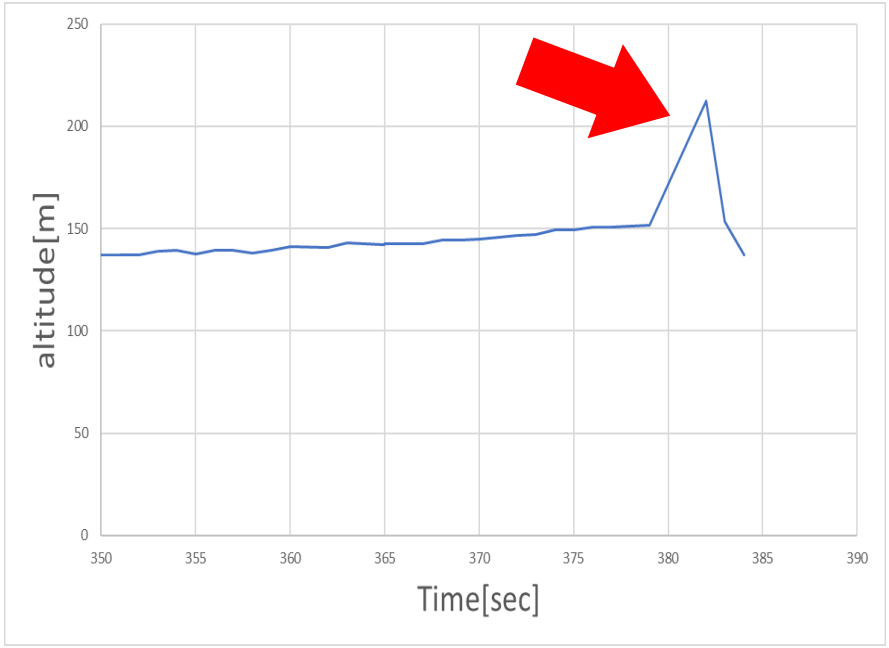
- Detached parachute inside the career
- Lost stabilizer and felled freely
- Breakage on motor fixture and Malfunction in control due to strong shock

- Autonomous control was not performed on field test

- Cause of parachute failure

Outlier was detected in Pressure sensor

Unintentional behavior due to Disturbance



Evaluation and Future work

- Technological advancement from previous works

Structural strength was improved

Control software (Proportional control, IMU upgrade)

- Robustness of sensing systems:

Pressure sensor: tolerance on a certain disturbance

- Verification process

Identification of system requirements and specification was considered in development process

Insufficient verification test due to delay on schedule

(Pressure sensor, field run test)

- Advanced Mission

Autonomous control and observation using detached device

Conclusion

- Hybrid Rocket

Improved the performance of each rocket component and increased the altitude reached

- CanSat

Improvement of Software and Structure was achieved

Robustness is the key to advancement of project