

ARLISS 2008

Comeback Competition Report

Tohoku Univ.& ENSEIRB

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Problem 1 : Rover is too slow

Velocity of the past rovers

2006 → 2km/h
(It requires 2h30min
for 5km navigation.)



2007 → 9km/h
(It requires 33min
for 5km navigation.)



Problem 1 : Rover is too slow



**We wanted to make it
faster.....**

Solution 1 : Faster robot

This year



17km/h max

- **Bigger batteries**

2007: Lithium Ion 7.4Vx1

2008: **Lithium Ion 7.4Vx2**

- **Small-gear-ratio**

2007: GearRatio 24:1

2008: GearRatio **14:1**

- **Bigger wheels**

2006: 15cm

2007: 17cm expandable

2008: **18cm** expandable



Problem 2 : Terrain is too rough
Solution 2 : Big wheels & high speed

18cm expandable and soft wheels
Maximum 17km/h



Problem 3 : Rover is easily stacked

The ground condition was the worst in the recent 4 years, because of **soft soil and many grooves...**

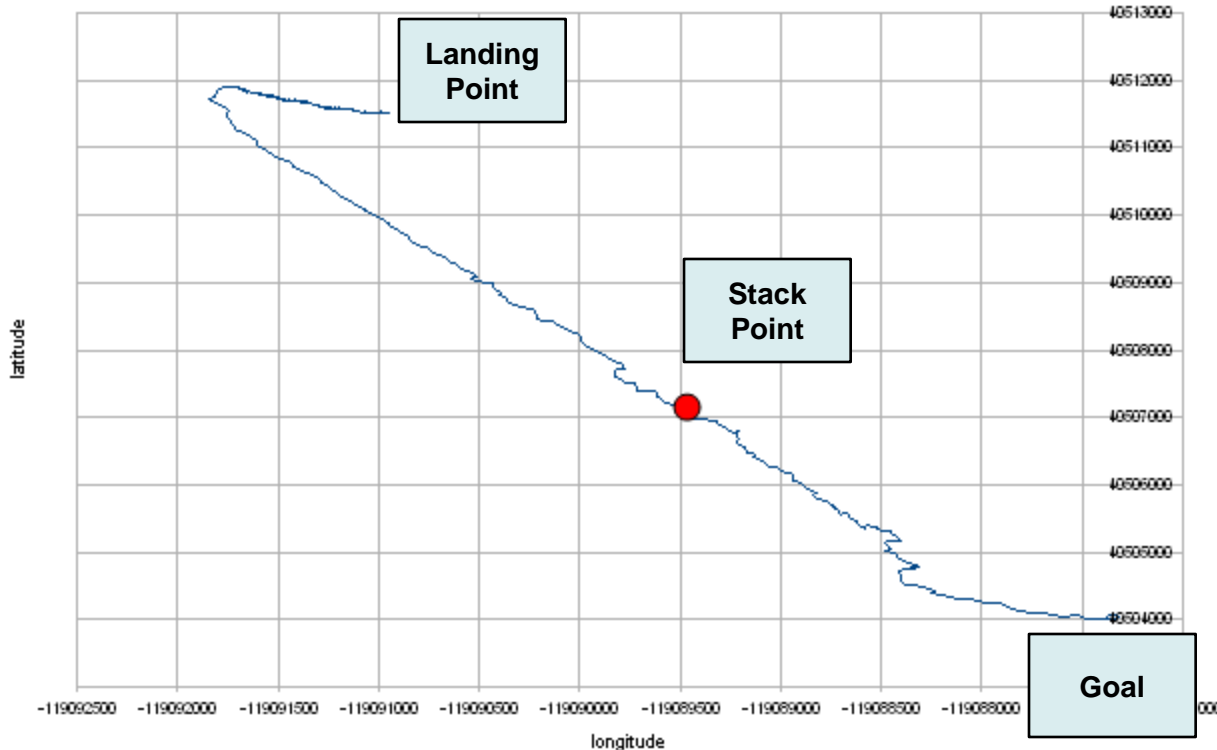


When the rover's body touched the ground, it was blocked to move.

Problem 3 : Rover is easily stacked

The Result of the 1st trial.
(Stacked in a soft **groove**...)

tracks of the ground



Solution 3 : Escape system

Cannot move ?



Escape Mode !!



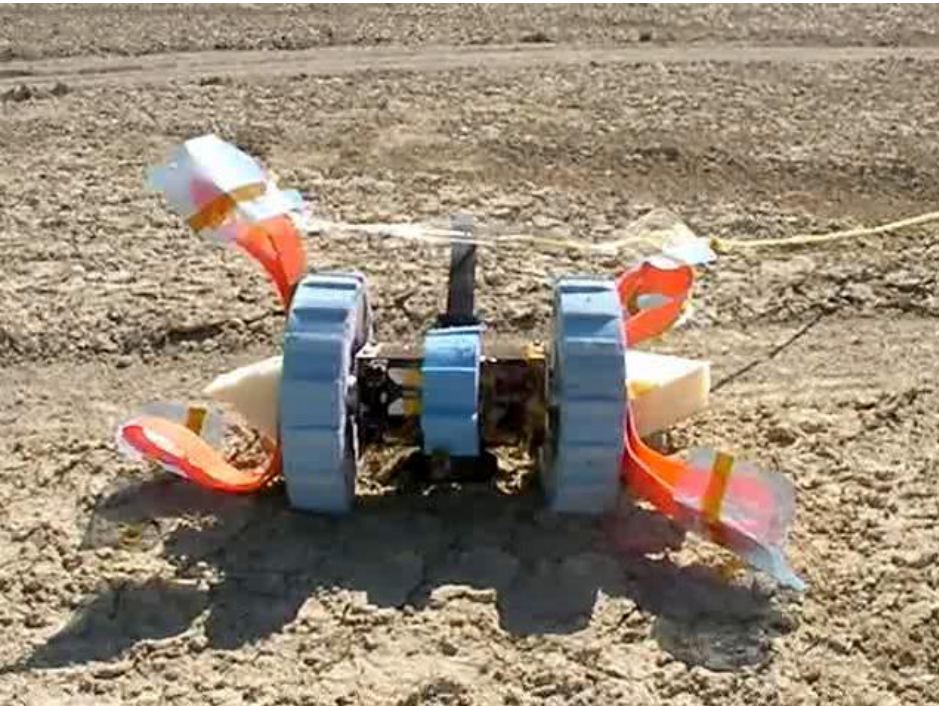
If GPS coordinate is the same within 15s...

- 1) Reverse motion with **FULL POWER**
- 2) Turning motion
- 3) Forward motion with **FULL POWER**
- 4) Return to navigation

Problem 4 : Parachute separation

Solution 4 : New separation system

2007 Version



Wheels rotation releases both side screws to separate orange parts.

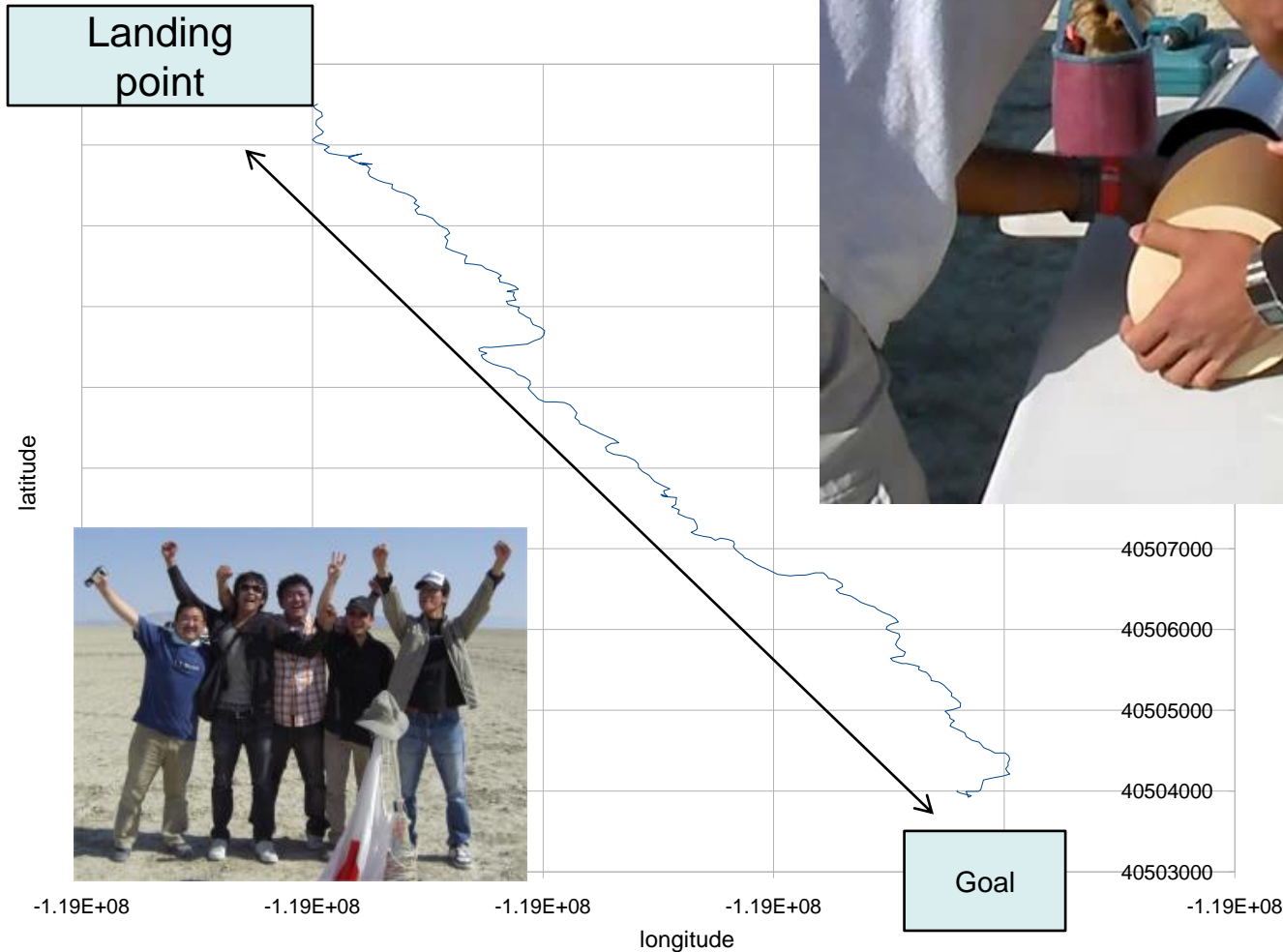
2008 Version



Fishing line is cut by a **heating wire** to release the cover-shell.

The Result of the 2nd trial

Direct distance: 1.65km
Actual journey : 2.08km



Conclusions

Finally, our rover reached the target point.

Key technologies were,

- Fast speed robot
- Big wheels & high speed to overcome bumps
- Escape system in case that the rover is stacked
- New parachute separation system.



Thanks Allen!



Thanks Eric!