

# ARLISS2009

## Comeback Competition Report

TOHOKU University

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# **September 2008**

## **at Blackrock desert**

# Back ground

**We are the champion!! (by Mr.Yusa)**



**Rover**

Tohoku Univ. team won  
the comeback competition 2008.

**April 2009**  
**at Sendai, Japan**

# Back ground

I don't take you to the ARLISS 2009 without something new...  
(Prof. Nagatani)



It is easy to run back if rover's wheel diameter is much larger...

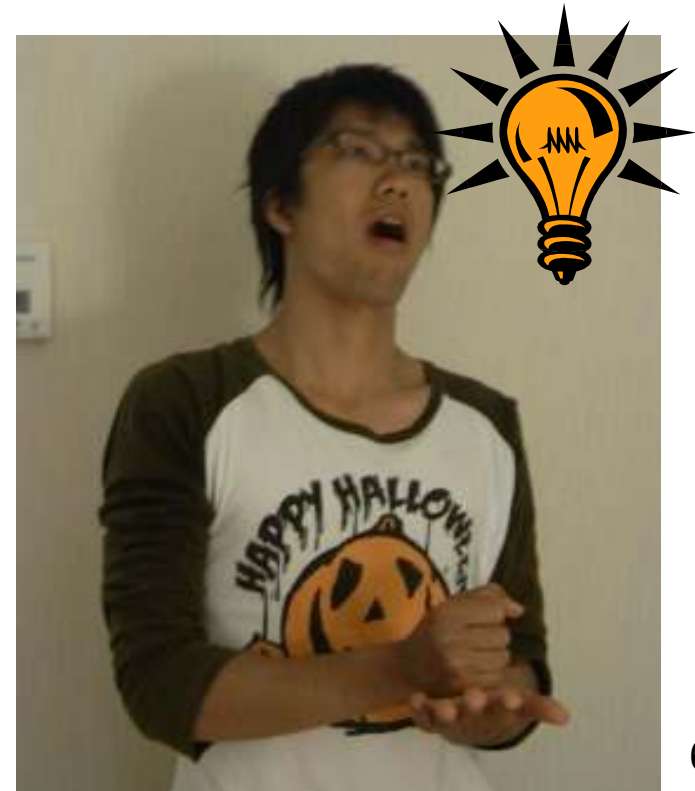


# Back ground

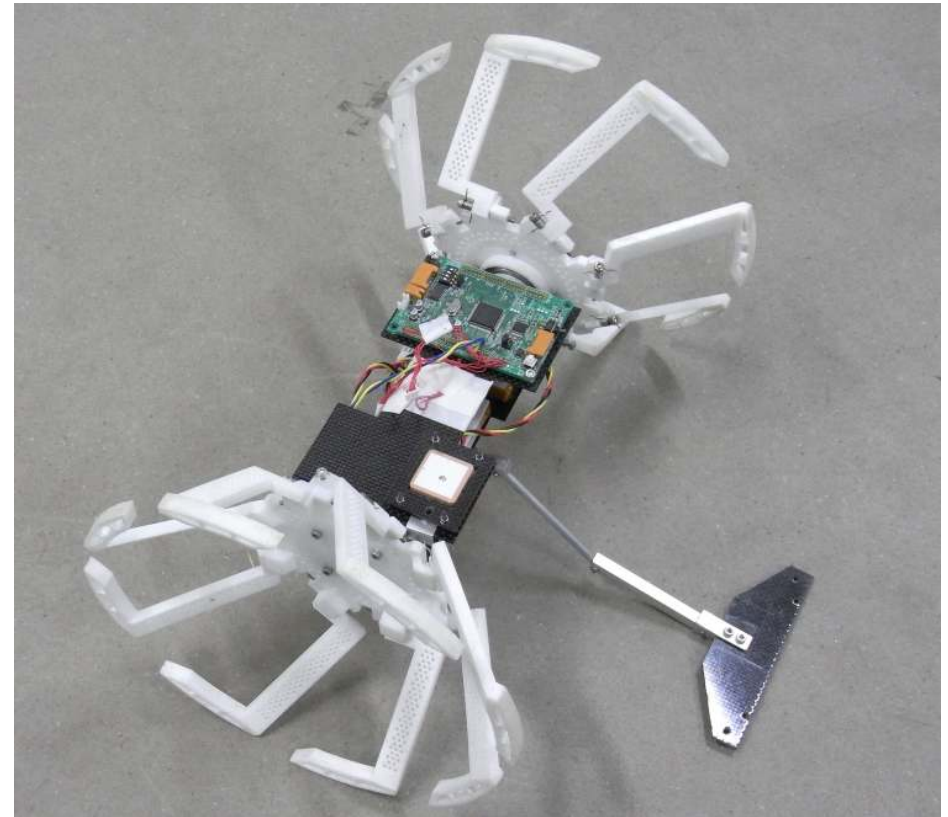
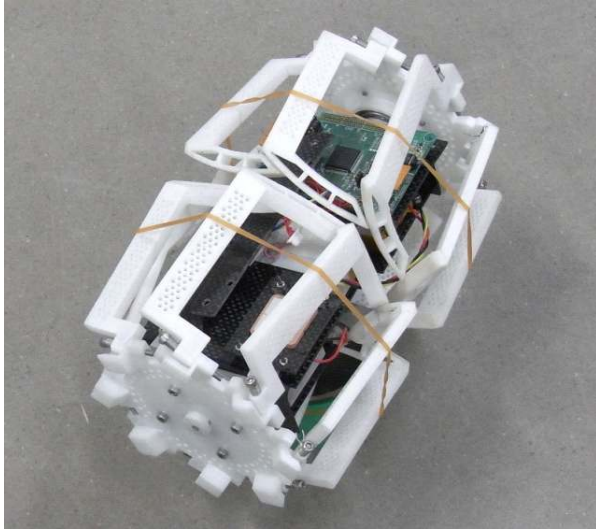
- ① Size limit :  
diameter  $\phi$  150mm , length 240mm
- ② Large wheels for rough terrain
- ③ Something new



Mmmm.....

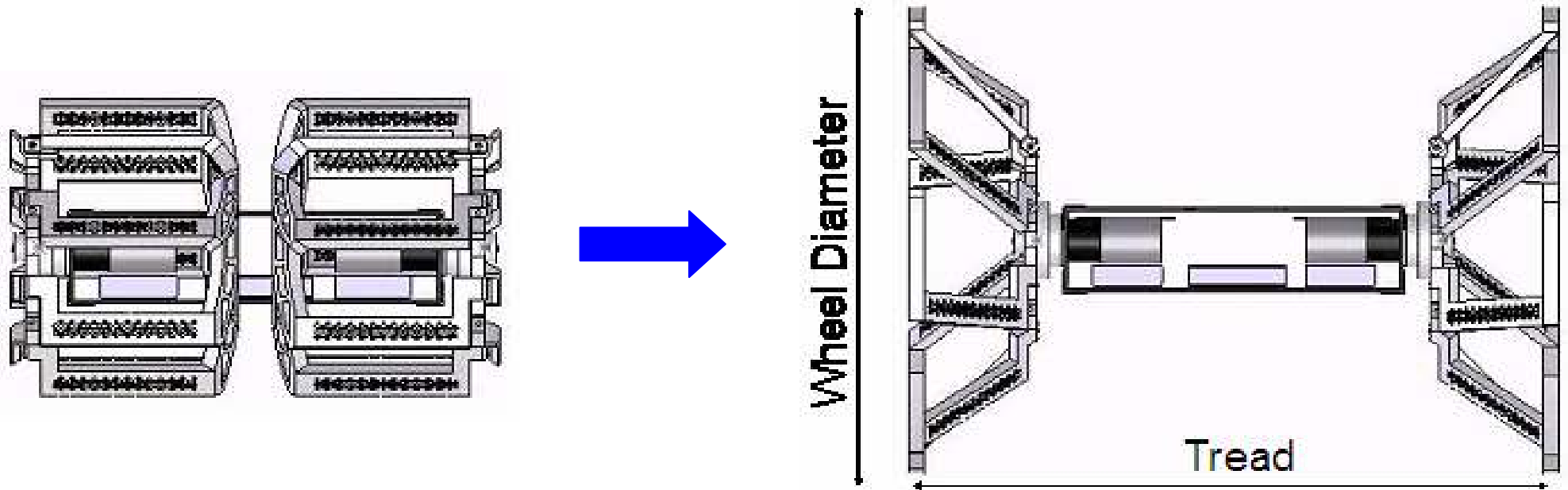


# WindMill- I



- Wheel diameter: 150mm → 240mm
- Tread : 240mm → 300mm

# WindMill- I



- Wheel diameter: 150mm → 240mm
- Tread : 240mm → 300mm

# WindMill- I

**Oh, MY GOD !!**

**Weight:**

**1150g ← 100g over**



To cut down the weight:

- Electric circuit (and micro controller) is changed.
- Some metallic bolts are changed to plastic.
- Make holes in legs to reduce the weight.

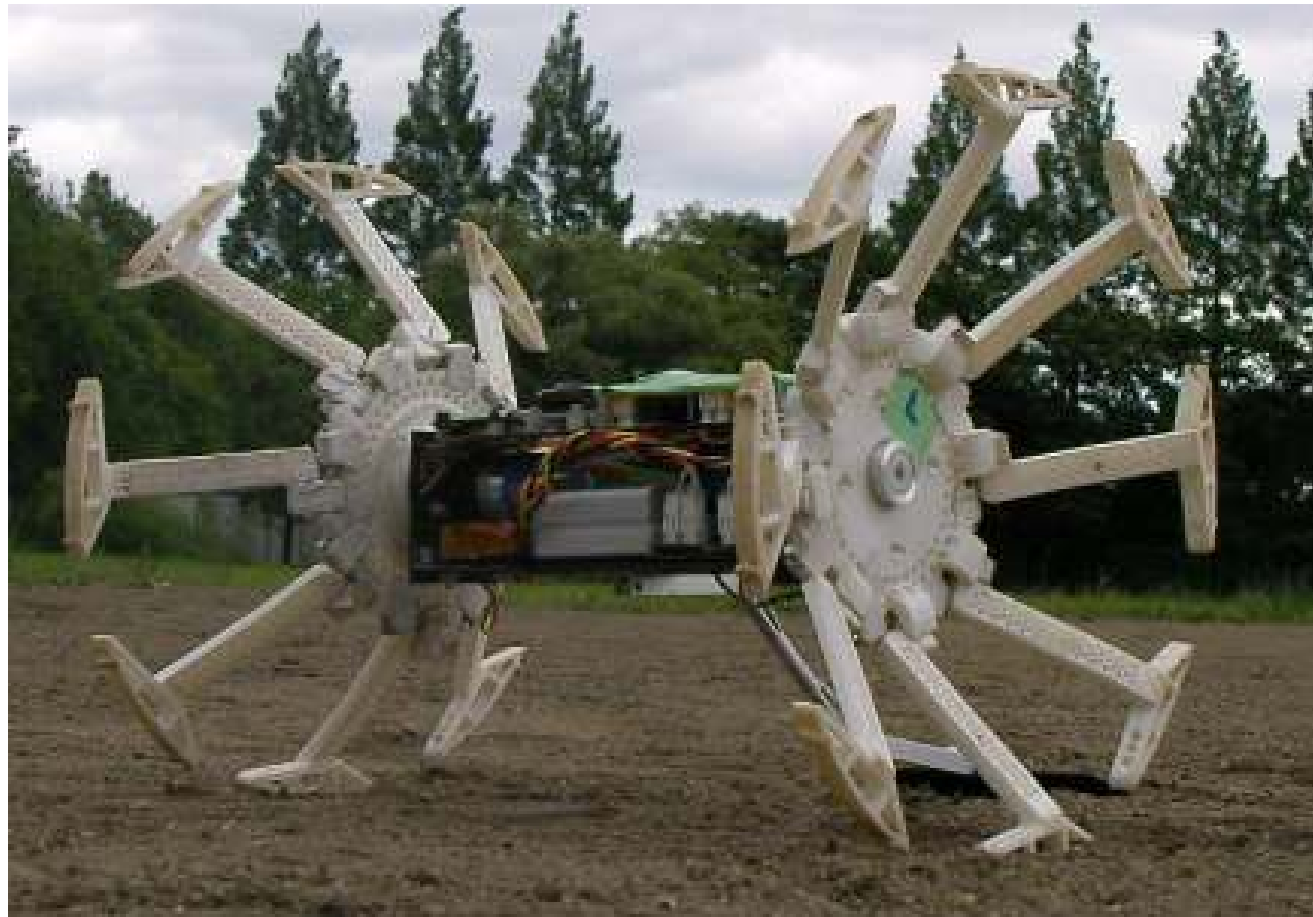
**24<sup>th</sup> August 2009**  
**at Sendai, Japan**

# WindMill- II

We developed new rover.

Total weight: 1053g

**Weight limit was cleared!!**



# Other stuffs : Beacon

We use XBee-pro as our rover's beacon.

Features:

- Linking with micro controller within 1 km via serial communication.
- Very useful to debug robot's program.
- Exchangeable from 'Low output' to 'High output'

Low output  
(10mW)



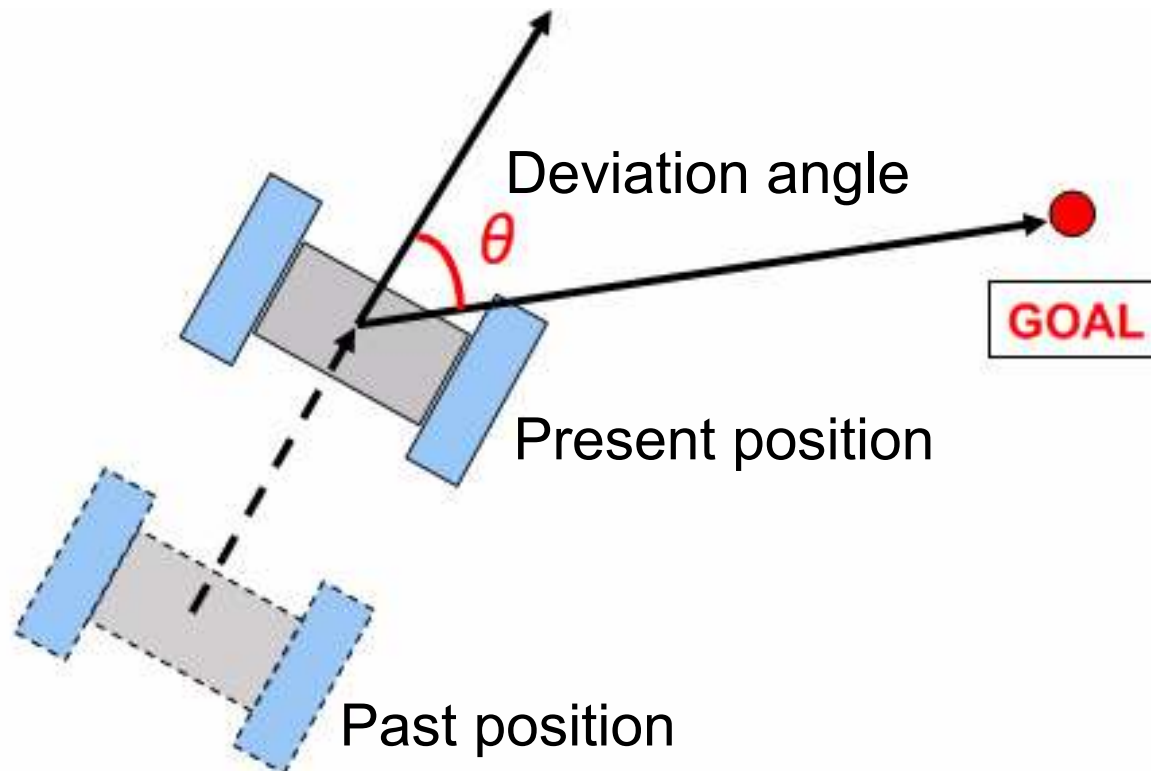
High output  
(60mW)



# Other stuffs : Navigation

## GPS based Navigation

It's the same strategy as the last year.



**17<sup>th</sup> Sep. 2009**  
**at Blackrock desert**

# The first flight



**Thanks Mike  
for nice flight !**



# The first flight



Parachute separation were succeeded in.  
But, the rover came back to the landing point<sup>16</sup>..

# The second flight



***Thanks Richard  
for nice flight ! !***



# Navigation experiment

## © Long distance navigation

After ARLISS competition,  
We challenged long distance navigation.  
In every 200m, wheel's leg was broken.  
At last, 4 legs were broken.



# Navigation experiment

## © Navigation on rough terrain



# Conclusion and future works

We gat many experiences about  
Mechanical expandable wheel .

**TOHOKU**  
university will be  
back next year.  
And,  
**We will**  
**win !!!!!!!!**

