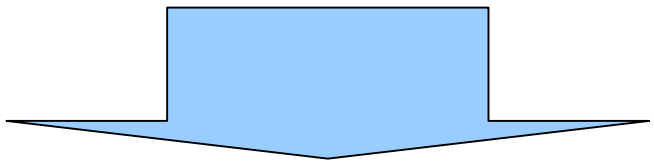
ARLISS 2006

Univ. of Electro Communication & Tokyo Institute of Technology Jointed Team
(Takadama Lab. Team)

電通大・東工大合同チーム（高玉研）

Team concept

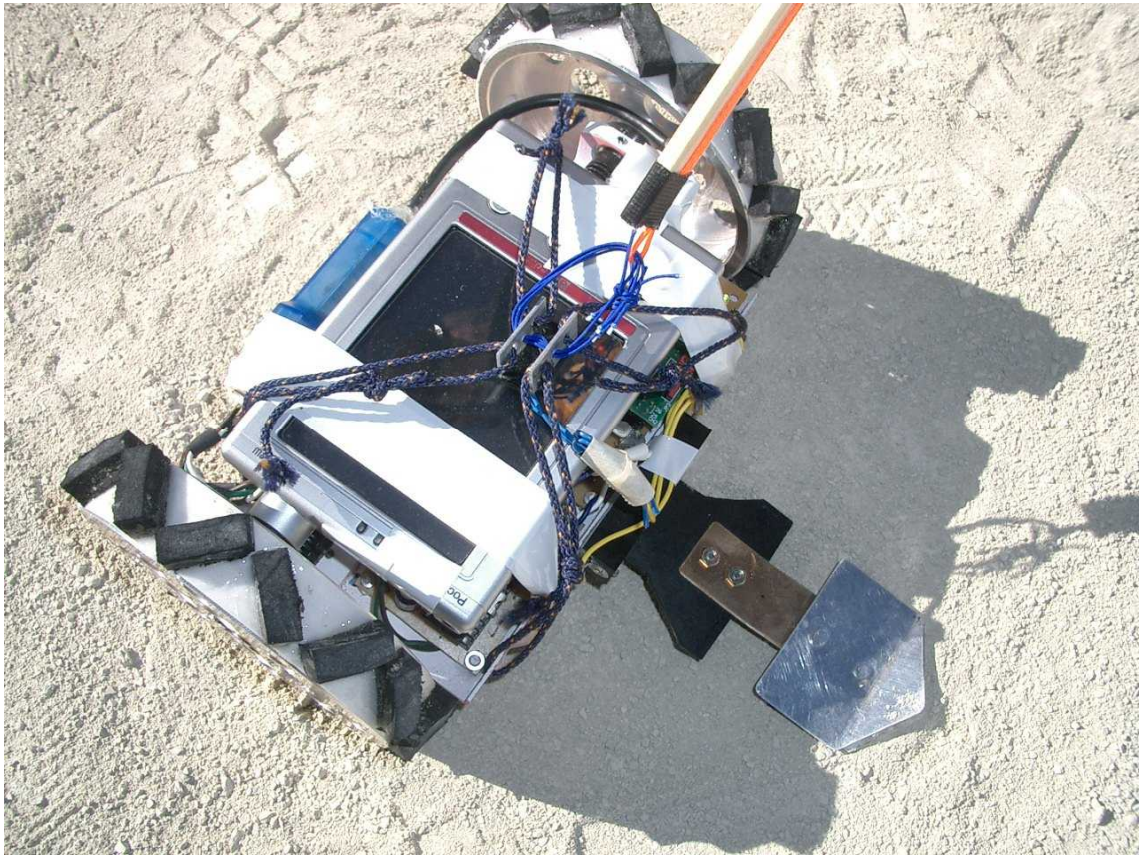
.In case some troubles occur in the space missions, hardware repair is impossible from the earth but software update is possible.
.Under such trouble condition, it seems that sensors or driving system don't work well.
.We assume such difficult condition, try to complete the mission.



We use a simple hardware & software control.

Our machine “MAICO”

(Motion Adjustment by Intelligent COmputing)



- Simple two wheels rover + “PDA”

MAICO's outline

Why simple two wheels rover?

- We assume that most of units break down.
- To show software controls advantage in such situations.

Why PDA ?

- High performance (CPU power, Memory size, HDD)
- Easy programming & High working efficiency (Windows OS)
- Easy maintenance (LCD touch panel, SD card)
- All in one small & light packaging(including GPS)

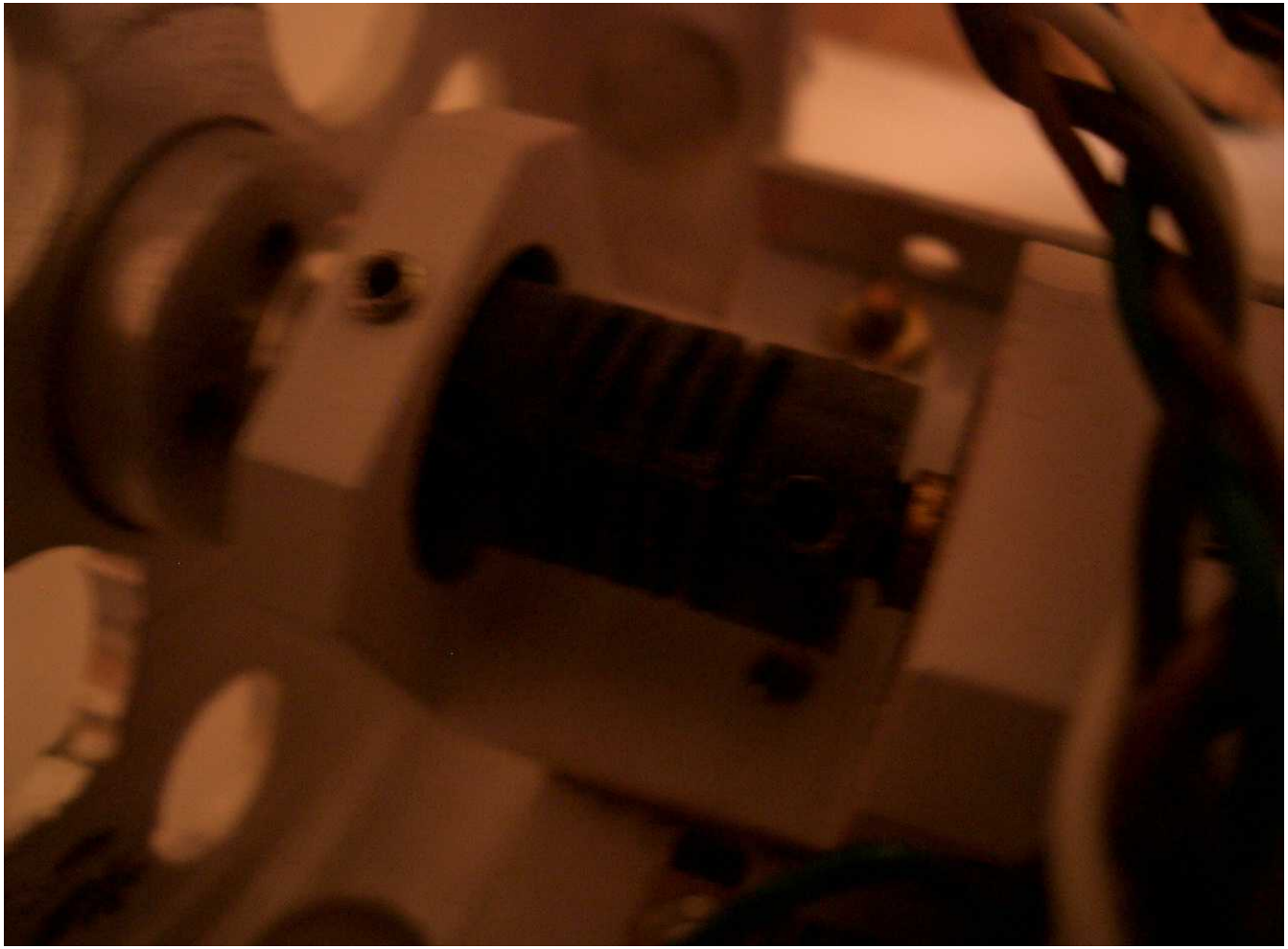
Hardware specifications

- **tractor based wheel**

Hardware specifications

- **Universal joint and bearing**

  Absorbing a landing shock



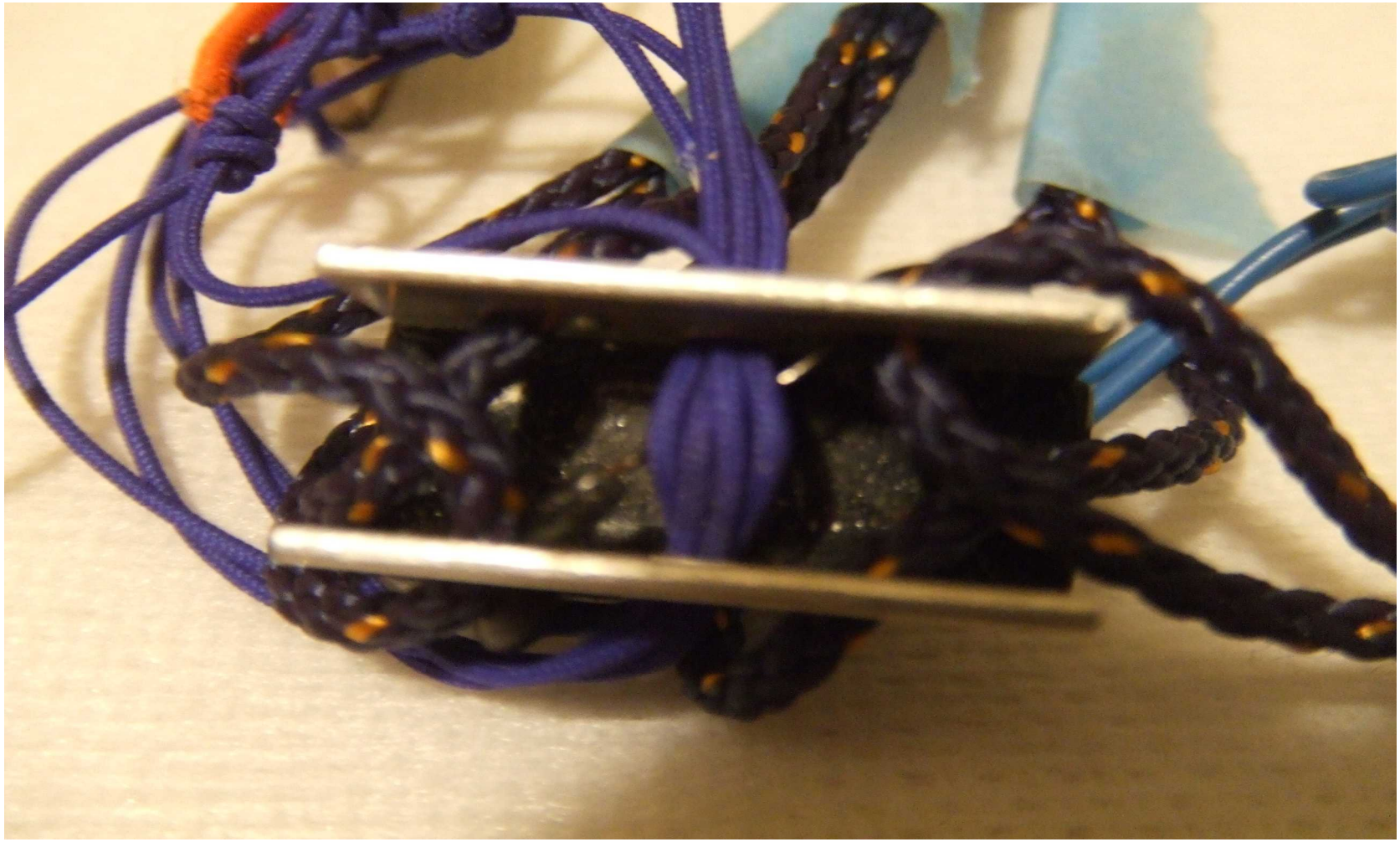
Hardware specifications

- **Dual battery**

  If one was lost or fault,
  this machine could run by another

Parachute cut-off system

- **Cut-off with Nichrome wire**



Software Specification

- We describe programs in PDA by C#.
- We can replace the programs by inserting SD card.
- We can adjust hardware in the field of anywhere using software.

First Flight

James' rocket carried up our rover.

Thank you, James.

Second Flight

- Ed’s rocket carried our rover to the sky

Thank you,Ed!

Results of First Flight

MAICO was founded at six miles away form the target point.

- MAICO was upside down.
- The Parachute was connected.
- PDA was stopped.

- Ultrasonic wave sensor did not start due to the upside down.
- But, we have escape mechanism which resolve problem. Unfortuntry, PDA battery had become empty, and it doesn't work.

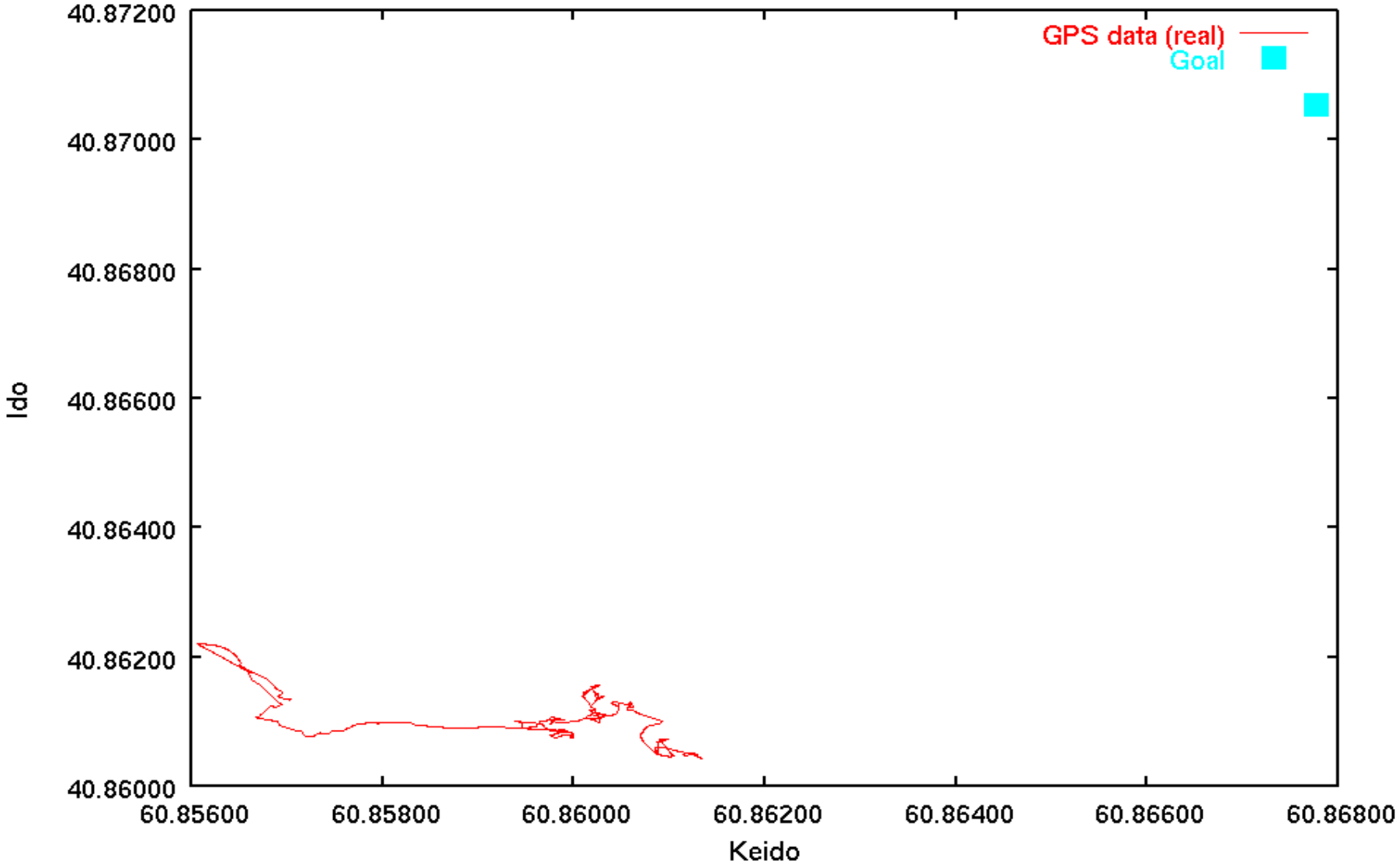
Results of Second Flight

- We found our rover at five and half miles away from target point.
- Left side of shaft was broken off
- The other functions are perfectly worked (ex. Navigating program, parachute cutting)

Future works

- Automatic setting ratio mechanism
- Angle estimation mechanism without compass.
- Accurate location estimation mechanism removing GPS noise
- Simple 3D map creation mechanism

Thanks for all ALISS staffs and aero-pac members.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Ido
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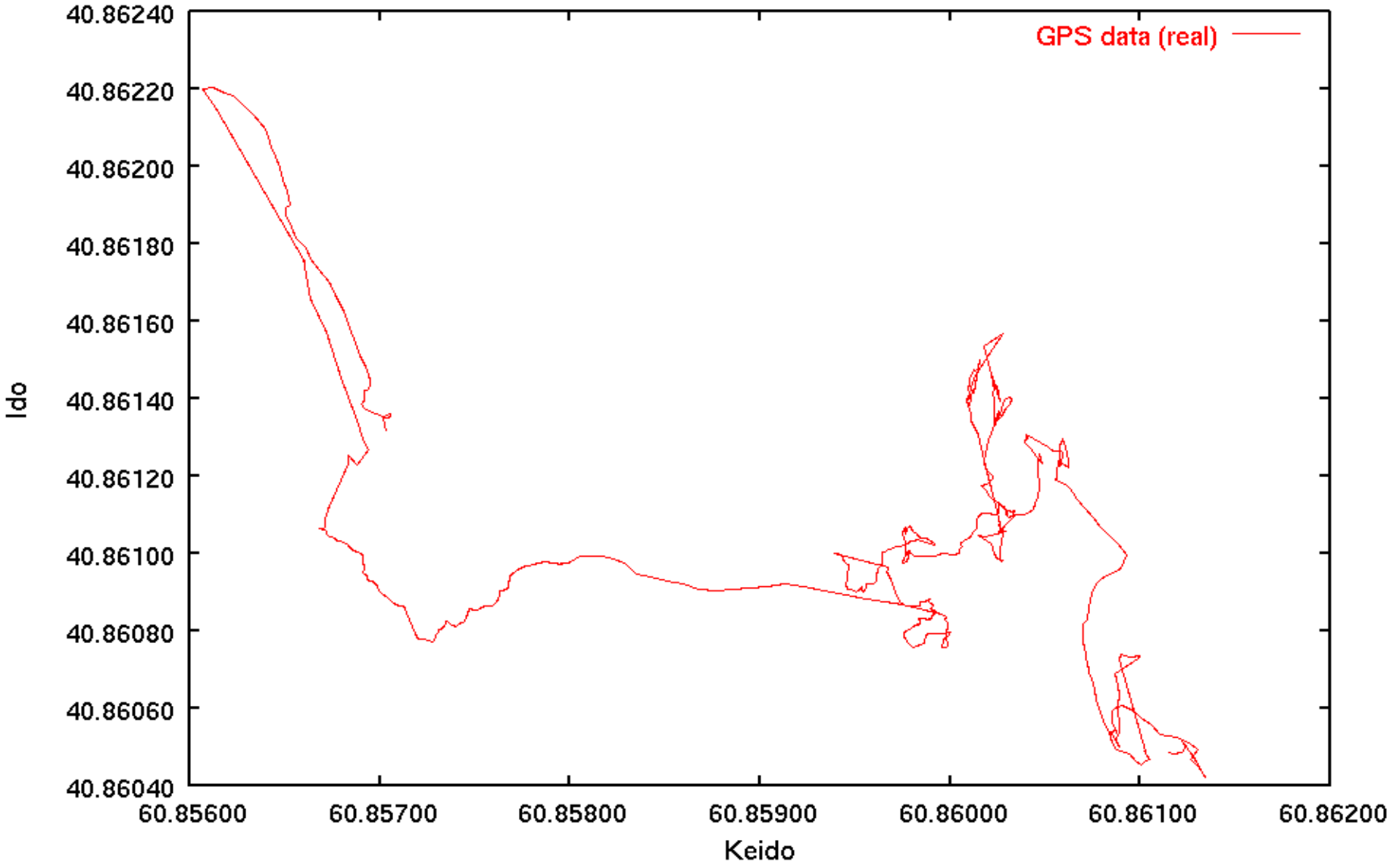
Keido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Keido
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