Aero-Train

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What is Aero-Train.

Sketch of the Aero-Train

High-speed ground vehicle

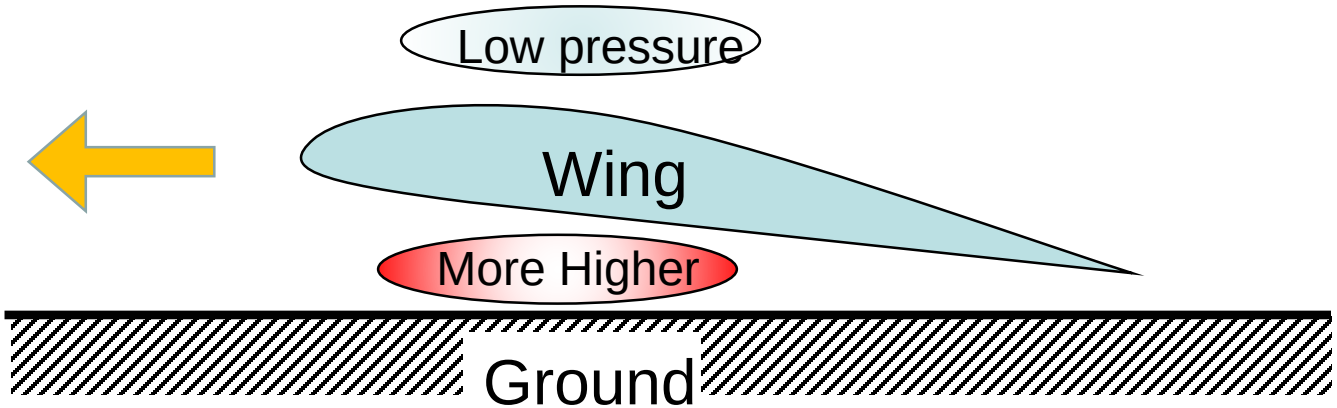
- Levitating aerodynamically
- Using wing-in-ground effect

⇒ Good efficiency

⇒ Operating with natural energy

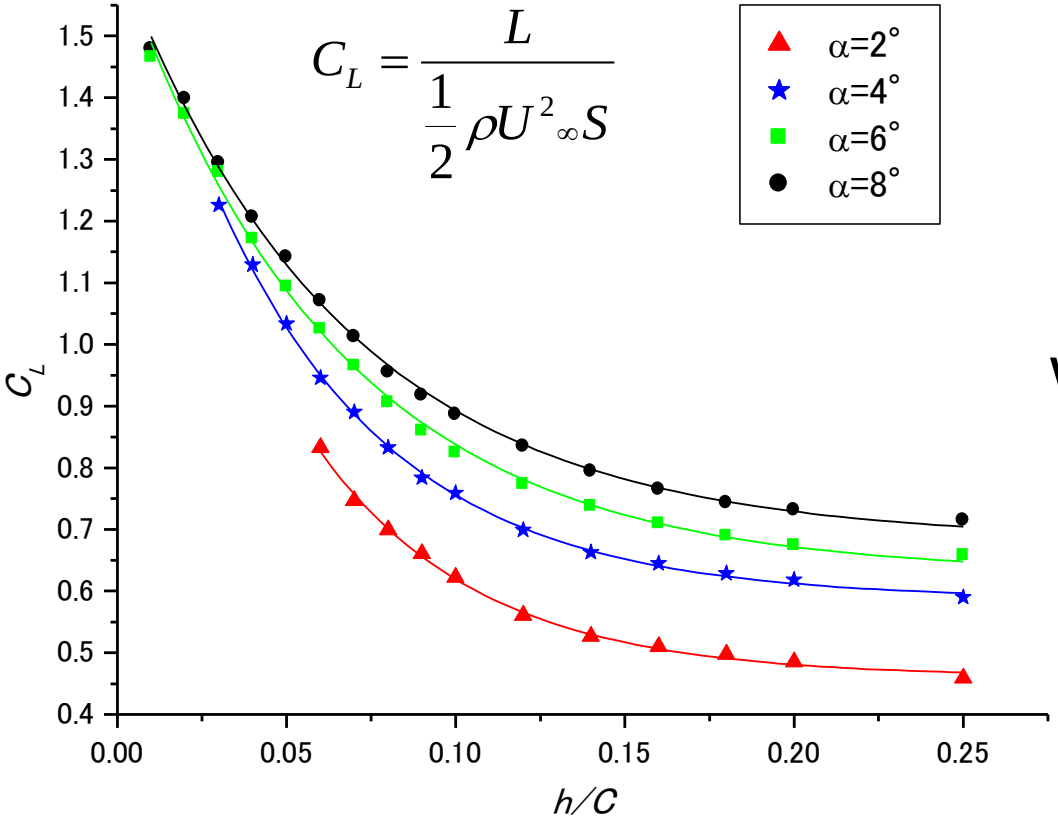
Wing-in-ground effect

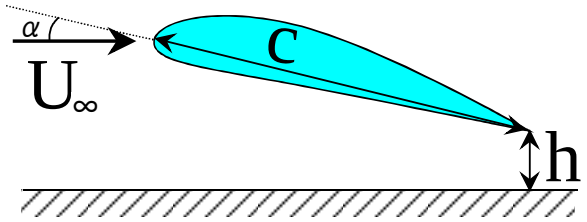
When a wing moves the near the ground, the lift increases.
Because, the high pressure becomes more higher
by existence of the ground.



This phenomenon is called the Wing-in-ground effect.

Wing-in-ground effect





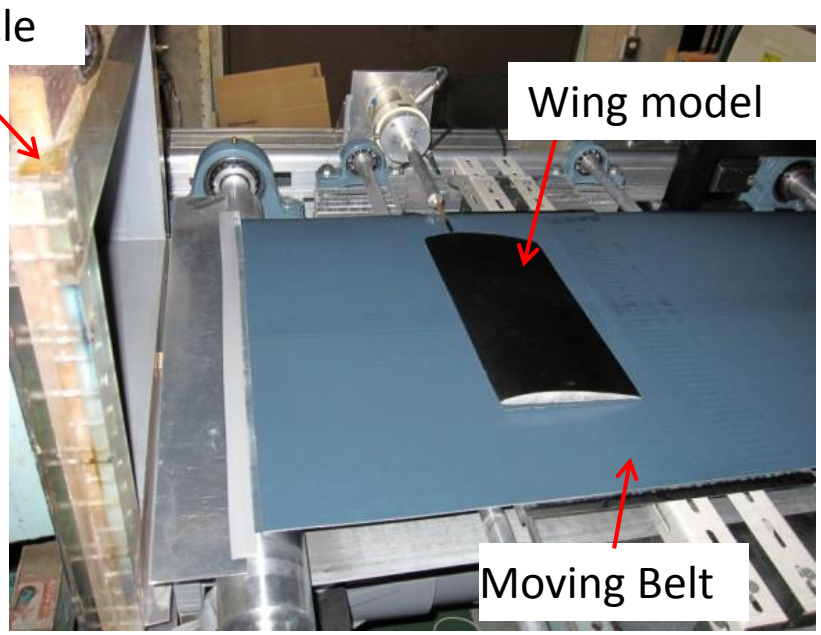
Wing approaches to the ground

⇒ Lift rapidly increases

Research of Aero-Train

Basic research

Wind tunnel experiment



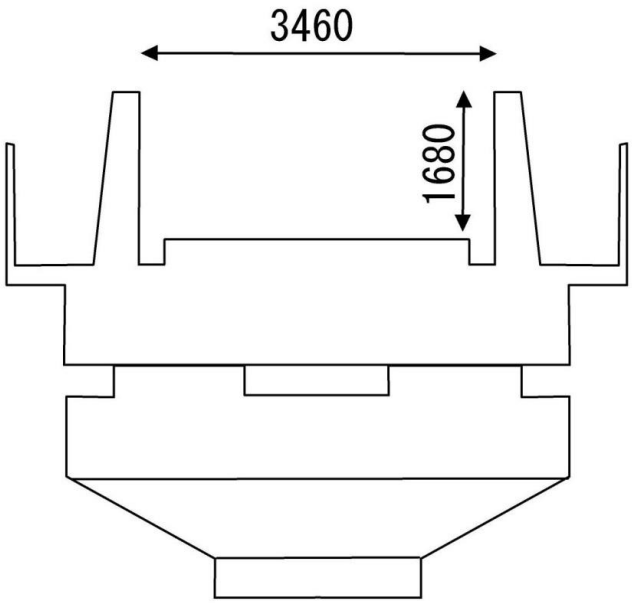
Levitating test

Levitating test
Test Course (Guide way)

We borrowed the guideway of MAGREV from JR Railway Technical Research Institute.

Guideway

Concreate raised track
Length ：7ｋｍ （2.4km is used for Aero-Train）
Width ： 3.5m （≒ width of one traffic lane of freeway）
Height of side wall：1.68m



cross-sectional view

Model of Aero-Train

ART001

1999～2001

1st running test model

Success in levitating run

ART002

2002～2009

Maximum speed : 120km/h

Efficiency (L/D) : 16

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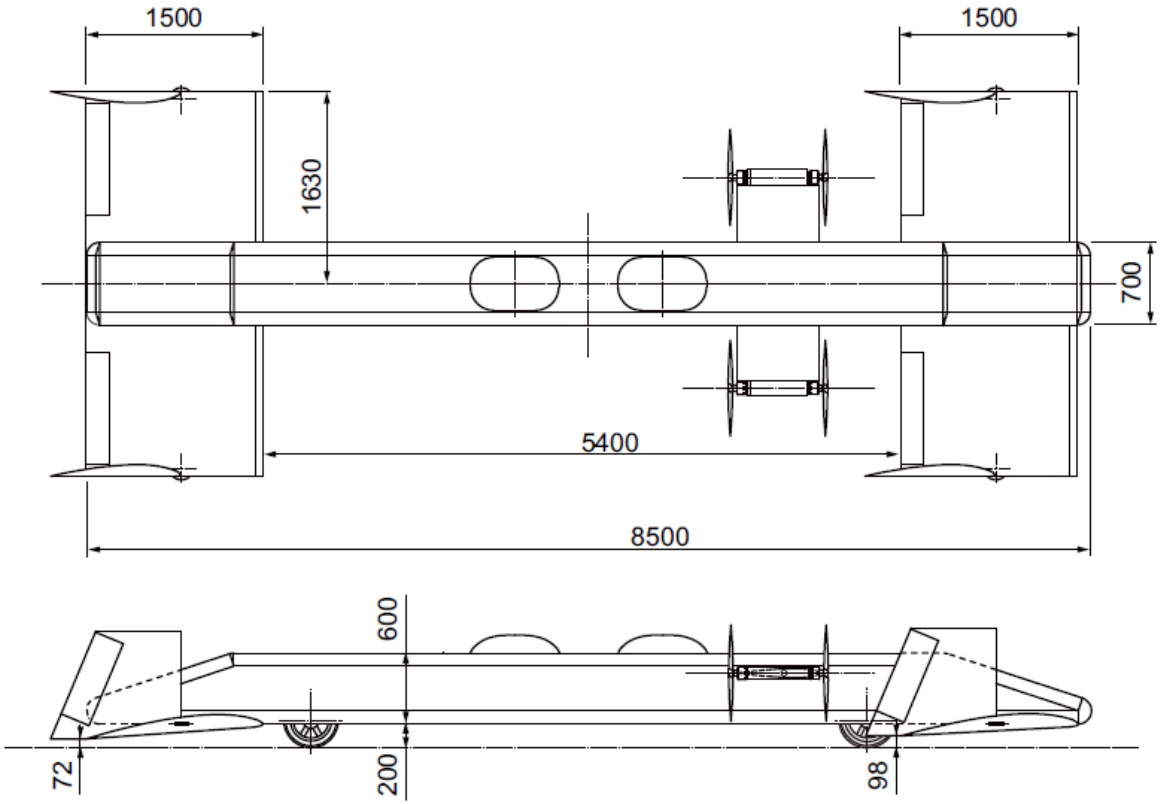
ART003

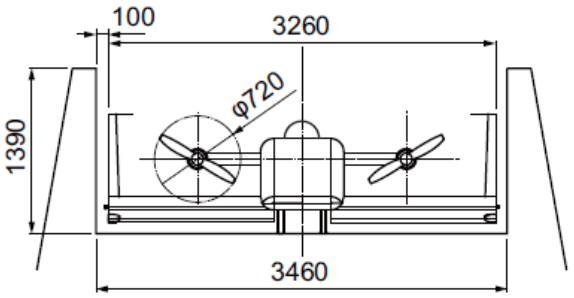
Aim of ART003

- Increase of running speed
- Increase of efficiency
- Manned levitating running

Material : Magnesium alloy (fire-resistant)
Mass : 520kg, (body:400kg, 2person:120kg)

Size of ART003

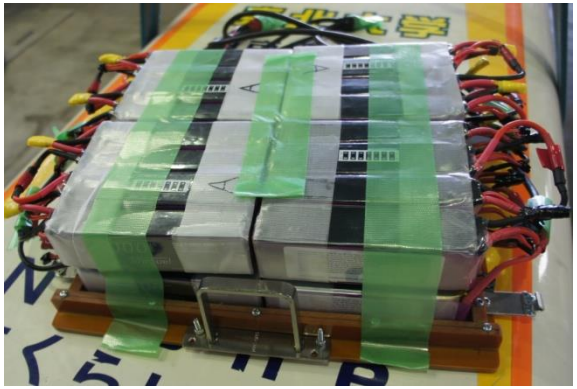




Length: 8.5m , Width: 3.26m , Height :1.0m

Propulsion device

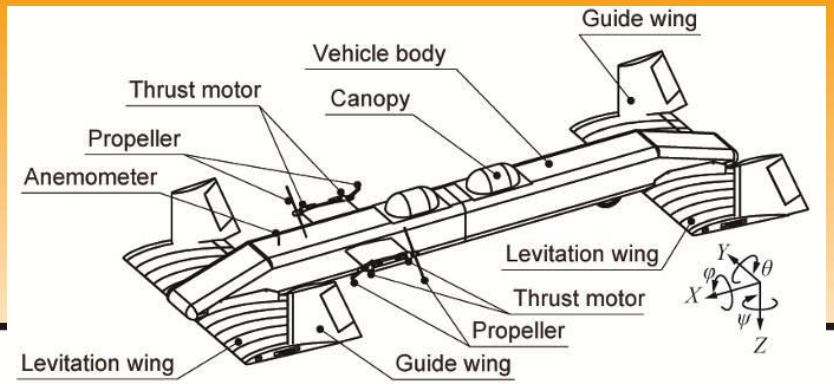
Tandem Propellers

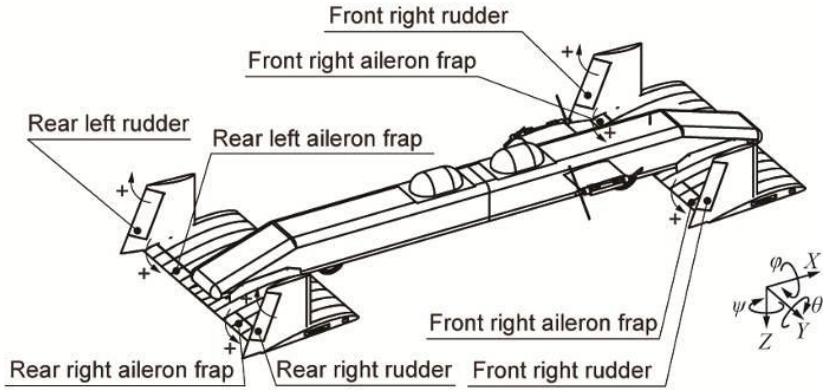


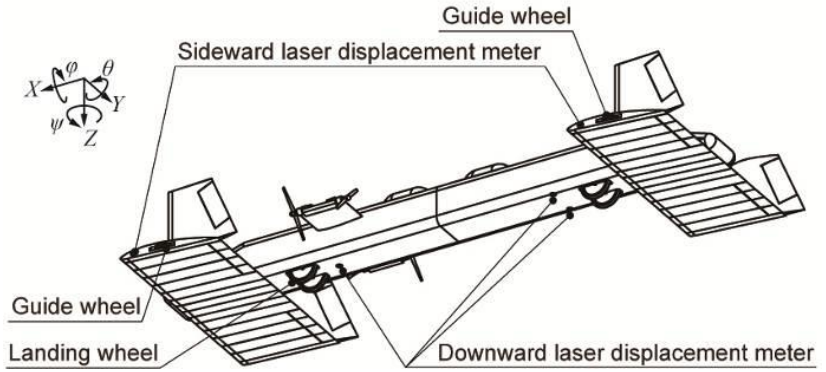
Batteries

4 propellers (Tandem arrangement)
4 Motors (10 kW ×4, for radio-controlled airplane)
Li-Ion Battery (for radio-controlled airplane)
51.8V (14 cells series connection)
880A Max (4 parallel connection)

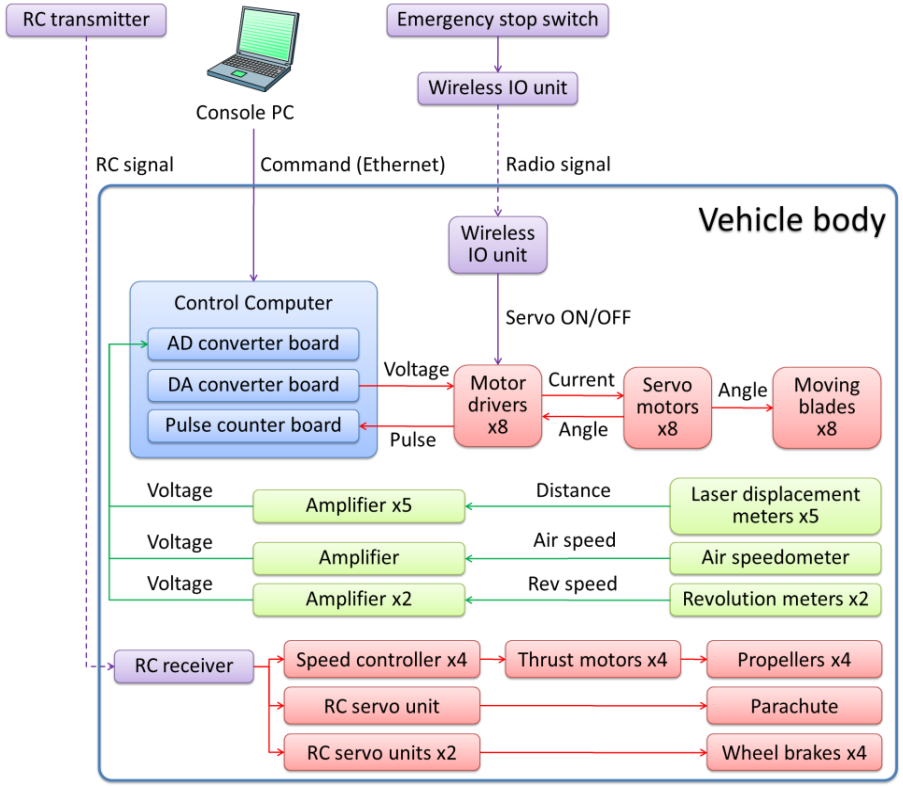
ART003
Control system







Attitude control is performed by a computer and sensors.



Result of ART003 test

- High speed was achieved (186 km/h).
- High lift-to-drag ratio was achieved (17.9) .
- Manned levitating running was succeeded.