



*Built for Your Future*

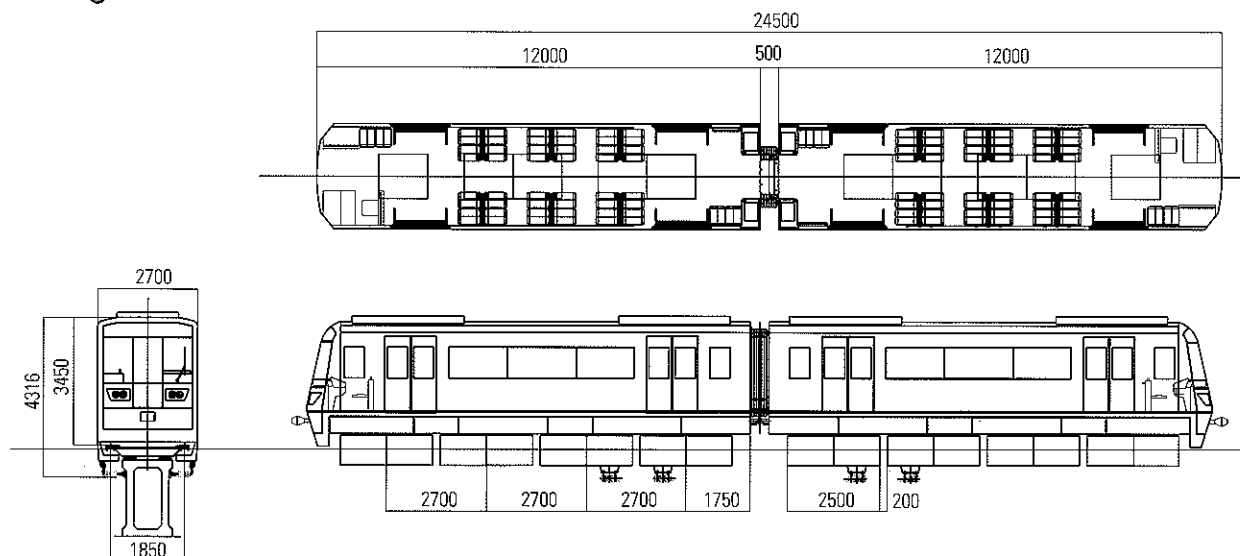
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**Maglev**  
(Magnetically Levitated Vehicle)  
**is now a reality**

HYUNDAI  
**Rotem**

# Specification

## ● Train Formation



## ● Vehicle Specification

Specifications	
<b>Train Formation</b>	2 vehicles (Mc1-Mc2)
<b>Vehicle Dimensions</b>	Length : 12 m (Train Length : 24.5 m)
	Width : 2.7 m
	Height : 3.45 m
<b>Vehicle Weight</b>	Tare : 20 t
	Laden : 28 t
<b>Passenger Capacity</b>	Normal : 93 persons/car (5 persons/m <sup>2</sup> )
<b>Propulsion System</b>	Linear Induction Motor + VVVF Inverter
<b>Levitation System</b>	Electro Magnetic Suspension Type, 8mm Air-gap
<b>Brake System</b>	Blending of Regenerative & Mechanical Brake
<b>Power Supply</b>	Voltage : 1,500 VDC
Train Formation	
<b>Max. Design Speed</b>	110 km/h
<b>Max. Operating Speed</b>	80~100 km/h
<b>Max. Acceleration</b>	4.0 km/h/s
<b>Max. Deceleration</b>	4.0 km/h/s in service, 4.5 km/h/s in emergency
<b>Noise Level</b>	● Max. 65 dB(A)
<b>Ride Comfort</b>	Below 2.0 in terms of UIC
<b>Max. Gradient</b>	70 ‰
<b>Min. Curve Radius</b>	50 mR

HYUNDAI

**Rotem**

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## General Description

### Rail revolution

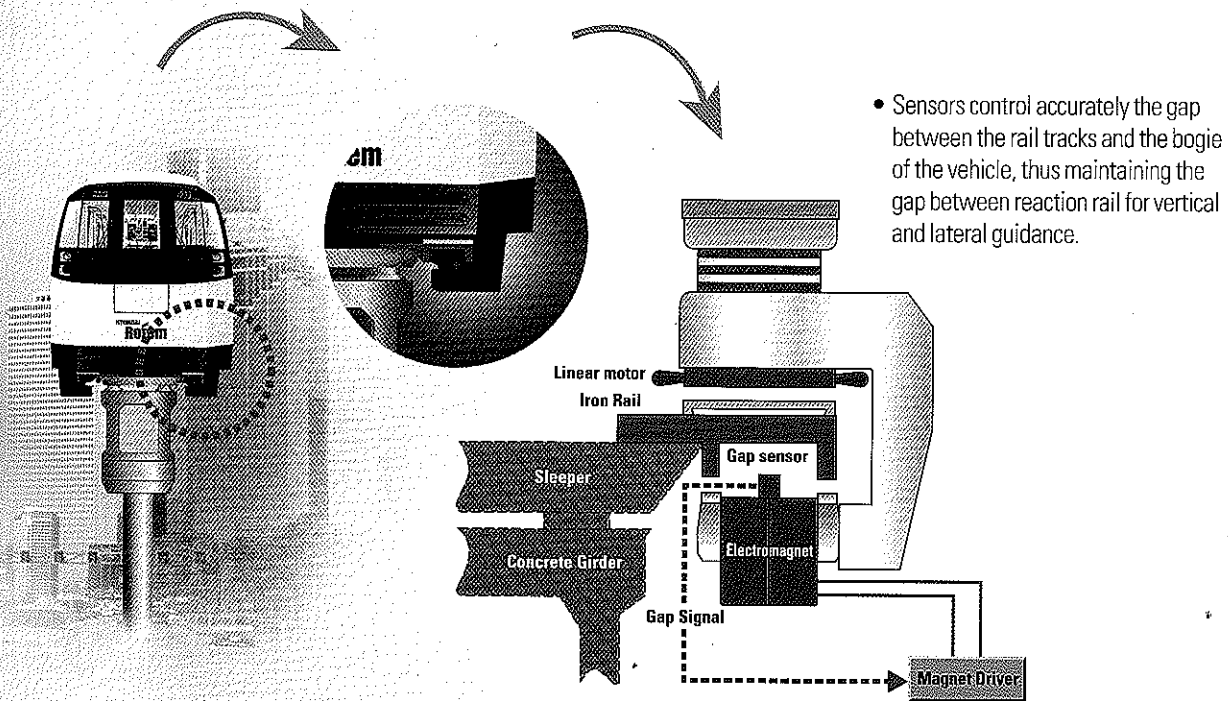
Maglev, always thought of as a futuristic model of rail transport, is already a reality in our world. It features a brand new approach to conventional rail technology.

### Ready to run

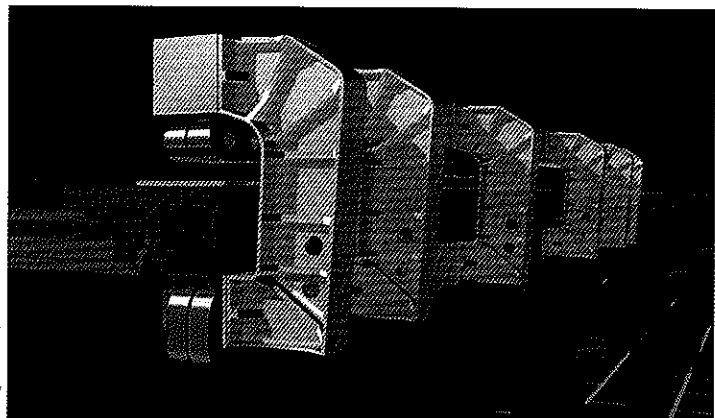
Hyundai Rotem's innovative Maglev technology offers clean, comfortable and safe transport for passengers and benefits operators with low maintenance costs and high operational efficiency.

### Principles

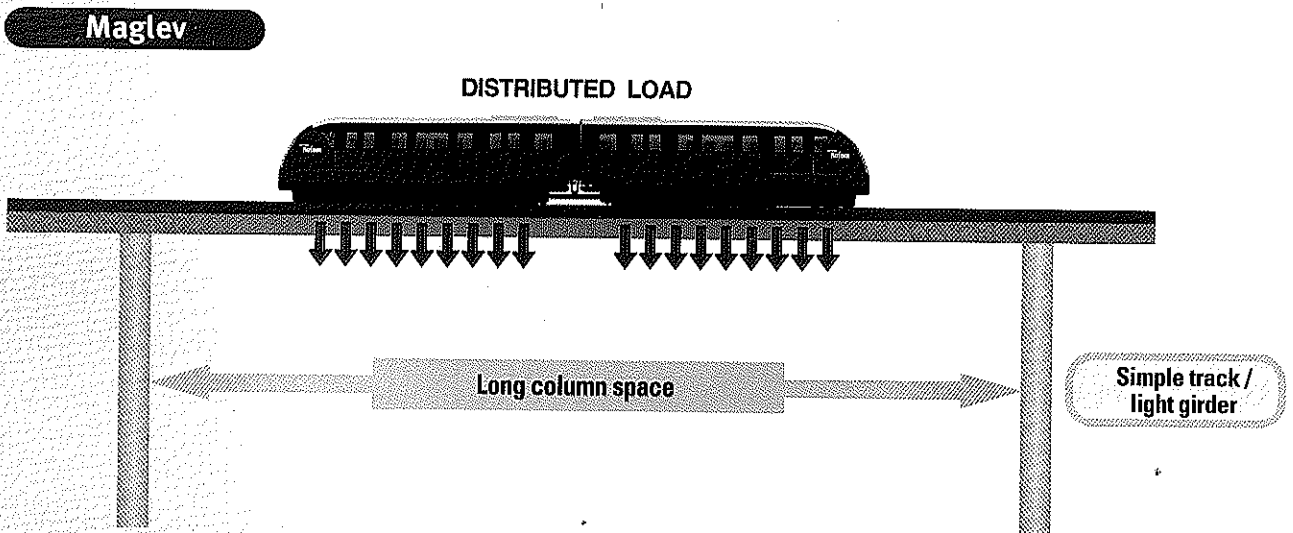
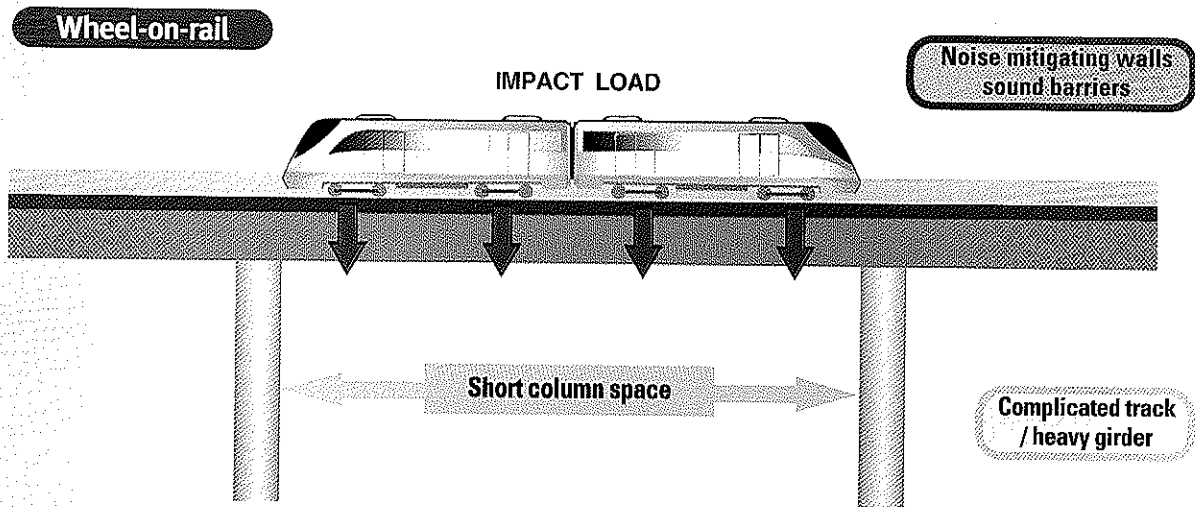
Attractive forces between rail tracks and electromagnets equipped on the bogie of the vehicle, provides levitation and maintains proper alignment of the vehicle.



- Maglev is propelled by a linear motor, which is made by splitting a rotary motor.
- The primary coil of the linear motor is mounted on the bogie, while the secondary reaction plate is installed on the rail.
- A voltage-fed inverter is used for the linear motor power control.

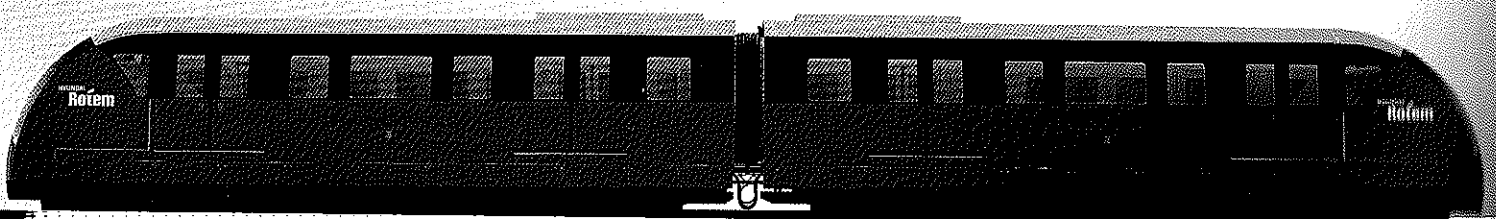


## General Characteristics



### • Lower construction and maintenance costs

- Evenly distributed load to the track allows simple and aesthetically pleasing structures.
- No need for noise protection barriers along the rail tracks.
- Fewer spare parts and lower maintenance / labor costs since fewer parts are subject to friction and wear.

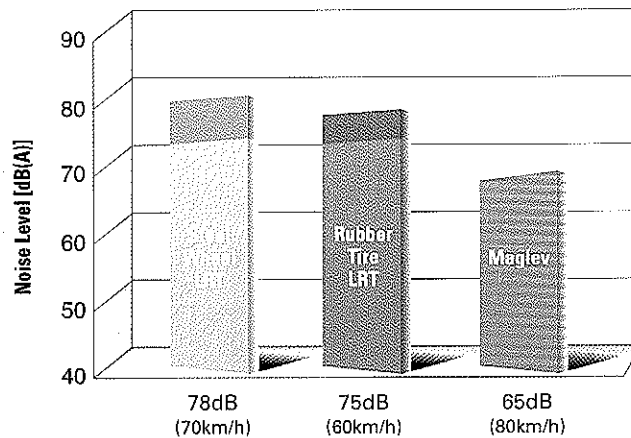


## General Characteristics

### ● Environmentally-friendly system

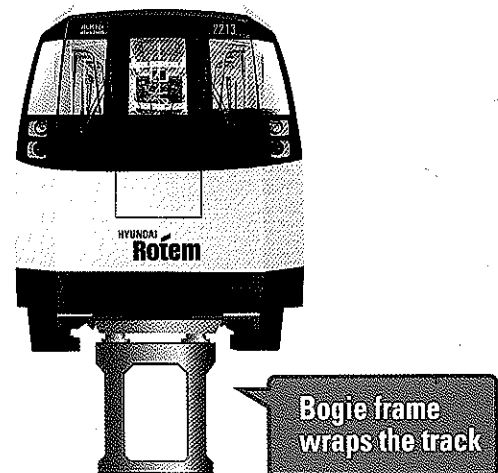
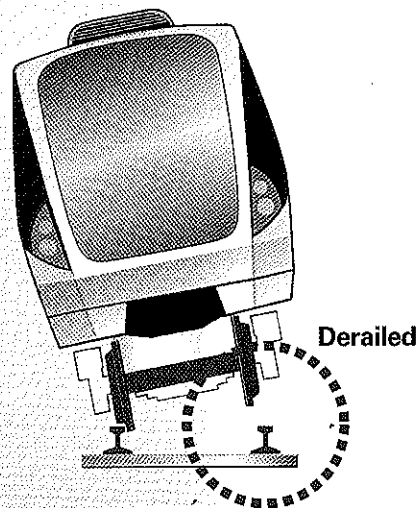
Due to non rail-wheel contact, the Maglev provides comfortable rides and causes minimum pollution.

- Lower Noise [ Less than 65dB(A) ]
- Lower Vibration [ Less than 0.02g ]
- No source of dust such as rubber, iron, etc.



### ● Safety

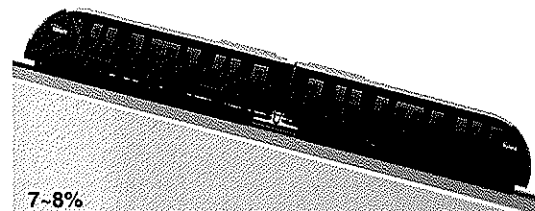
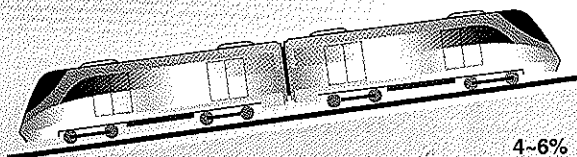
Maglev is safe from derailment and overturning since the bogie frame wraps the track unlike conventional steel wheel on rail.



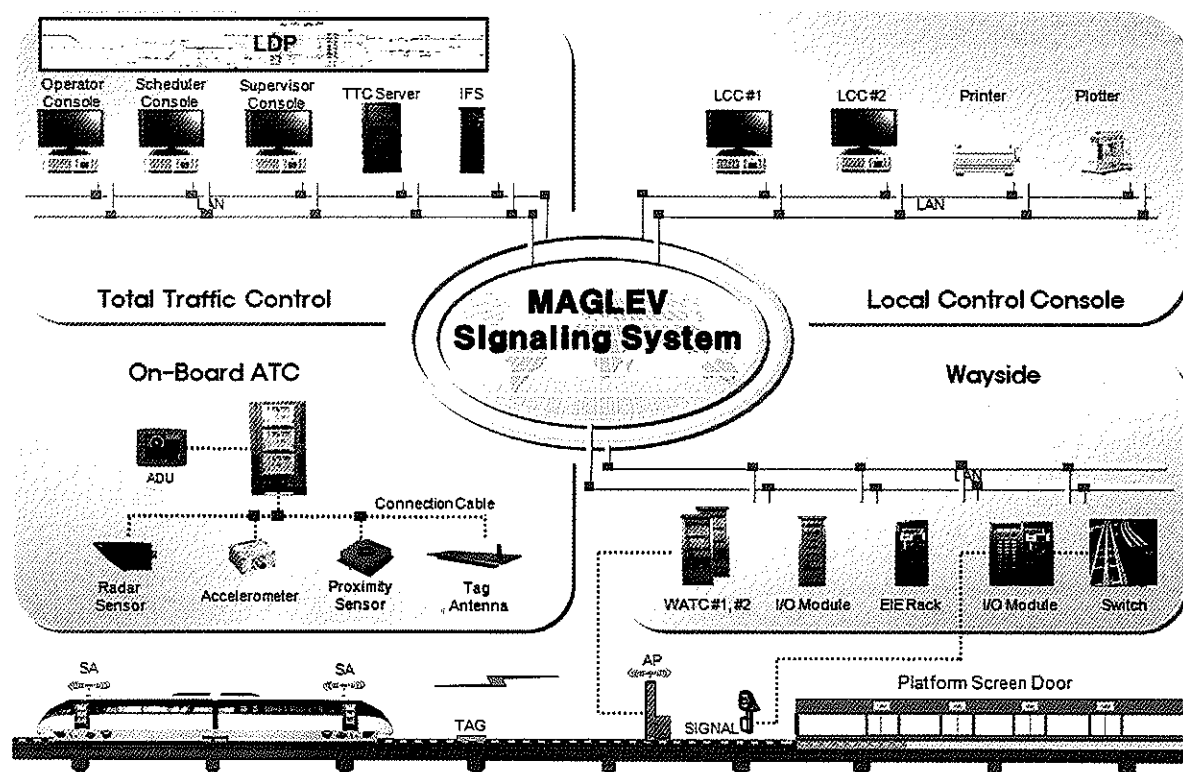
### ● Excellent driving capabilities

Maglev is propelled by a linear motor generating traction force directly to the rail and thus it.

- Does not rely on adhesion. (operate in severe weather)
- Can be operated on steep gradients. (powerful climbing capability-max. 8%)



# MAGLEV Signaling System



## ● Mid-term Project for the Technology Development managed by the Ministry of Commerce, Industry and Energy

### ■ Introduction

Development of the total solutions for on-board & wayside signaling system featuring driverless operation and Communication Based Train Control (CBTC)

### ■ Development Period

- #1 Phase: October 2003 ~ September 2006 (3 years)
- #2 Phase: October 2007 ~ September 2008 (2 years)

### ■ Development Scope

- Automatic Train Protection / Automatic Train Operation (ATP/ATO)
- Electronic Interlocking Equipment (EIE)
- Wayside Automatic Train Control (WATC)
- Total Traffic Control (TTC)

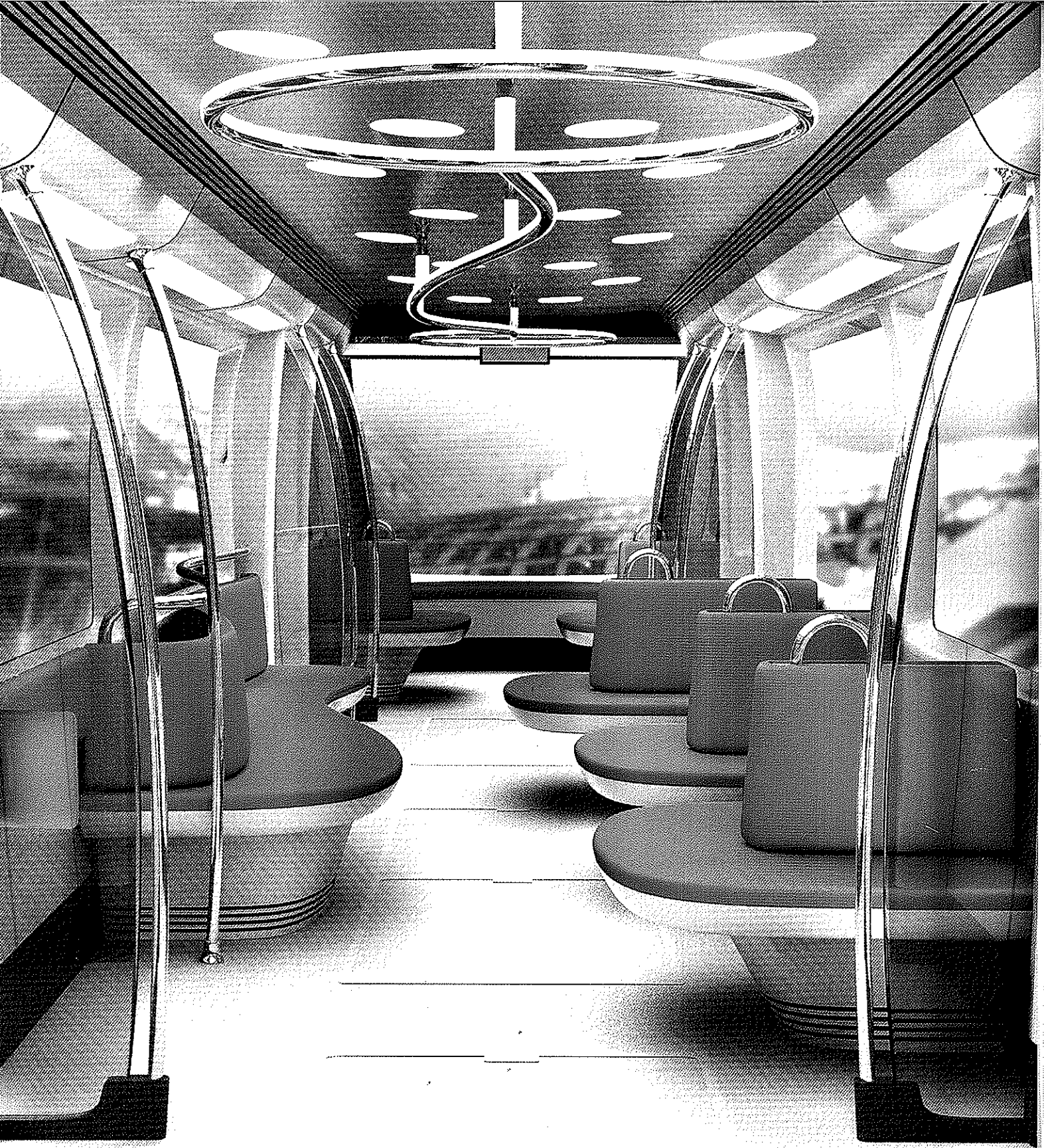
### ■ Progress

- Completed on-board & wayside signaling system, command equipment
- Passed the environmental test for on-board & wayside signaling system, EIE, WATC (March 2006)
- To perform the test for interface and driverless operation on the test route between National Science Museum and EXPO Science Park (March 2007 ~ September 2008)

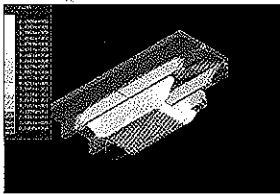
### ■ Expecting Effect

- Secured total solutions for on-board & wayside signaling system
- Applied in urban rail transit system and light rail transit system





# Development History of Maglev



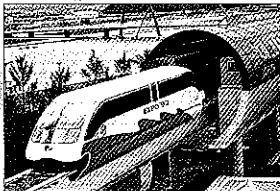
**1986**

Started the development of Magnetically Levitated Vehicles (Maglev)



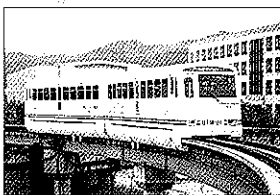
**1990**

Completed the development of prototypes for HML-01 and HML-02



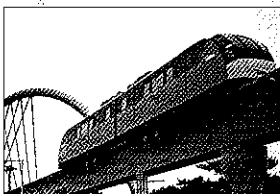
**1993**

Operated HML-03 in Daejeon EXPO 1993  
- Operation period: 3 months  
- Total passengers: 120,000 persons



**1994**

Performed the development of UTM-01 according to the national policy of the Ministry of Science and Technology (May 1994 ~ September 1999)  
- Operation distance: 70,000 km  
- Performed jointly with Korea Institute of Machinery and Materials



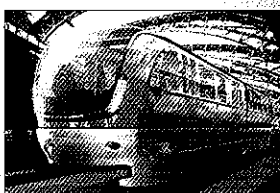
**2003**

Performend the development of UTM-02 according to the national policy of the Ministry of Commerce, Industry and Energy (October 2003 ~ September 2008)  
- Driverless Operation System  
- Preliminary Operation between National Science Museum and EXPO Science Park (April 2008 ~ )



**September  
2004**

Exhibited UTM-02 at InnoTrans 2004 held in Berlin, Germany



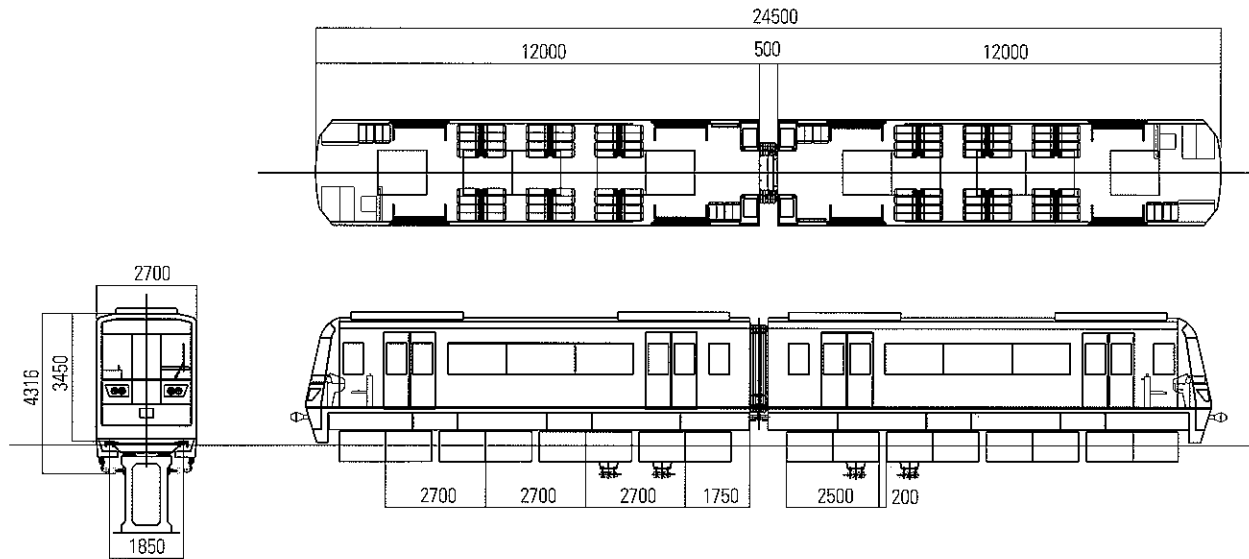
**December  
2006**

To perform Urban Maglev Project managed by the Ministry of Construction and Transportation (December 2006 ~ November 2012)  
- To perform the Development of Vehicle as a chief director  
- To manage the Analysis of RAMS and LCC



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