# RAILEVO

*Re-Think Rail Transportation*

*Design Engineer:* ***Federico Bernabei***

federicobernabei@hotmail.com

# RAILEVO

an autonomous rail-taxi system

- **Electric rail vehicles**

  High speed – ultra efficient

- **Light & compact infrastructure**

  Railway & stations

- **Personalized service**

  On demand – from A to B non-stop

# Conventional Railways

## Current user experience cannot be improved:

- Constrained departure times
- Obligatory stops
- Train connections


## Infrastructure:

- Cumbersome
- High environmental impact
- Extremely expensive

**RAILEVO** : the alternative solution

# RAILEVO

Compared to conventional railways:

**User experience:**

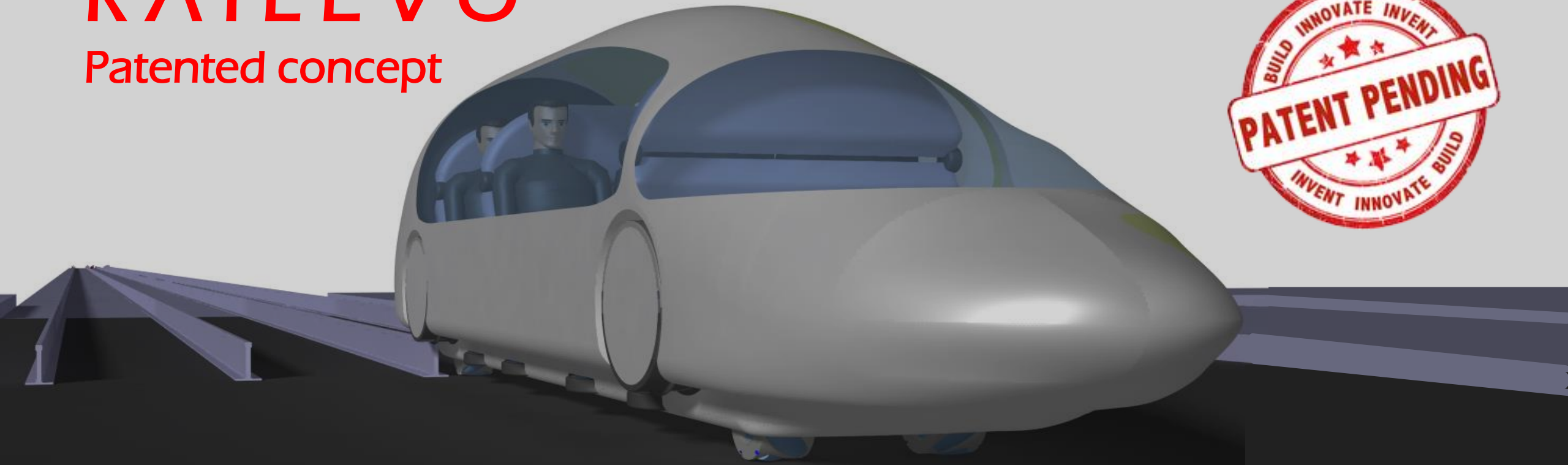
- on-demand
- non-stop service 24/7
- faster average speed

**Infrastructure:**

- Compact: ½ width ½ height,
- a quarter of the cost per Km

# RAILEVO

## Patented concept



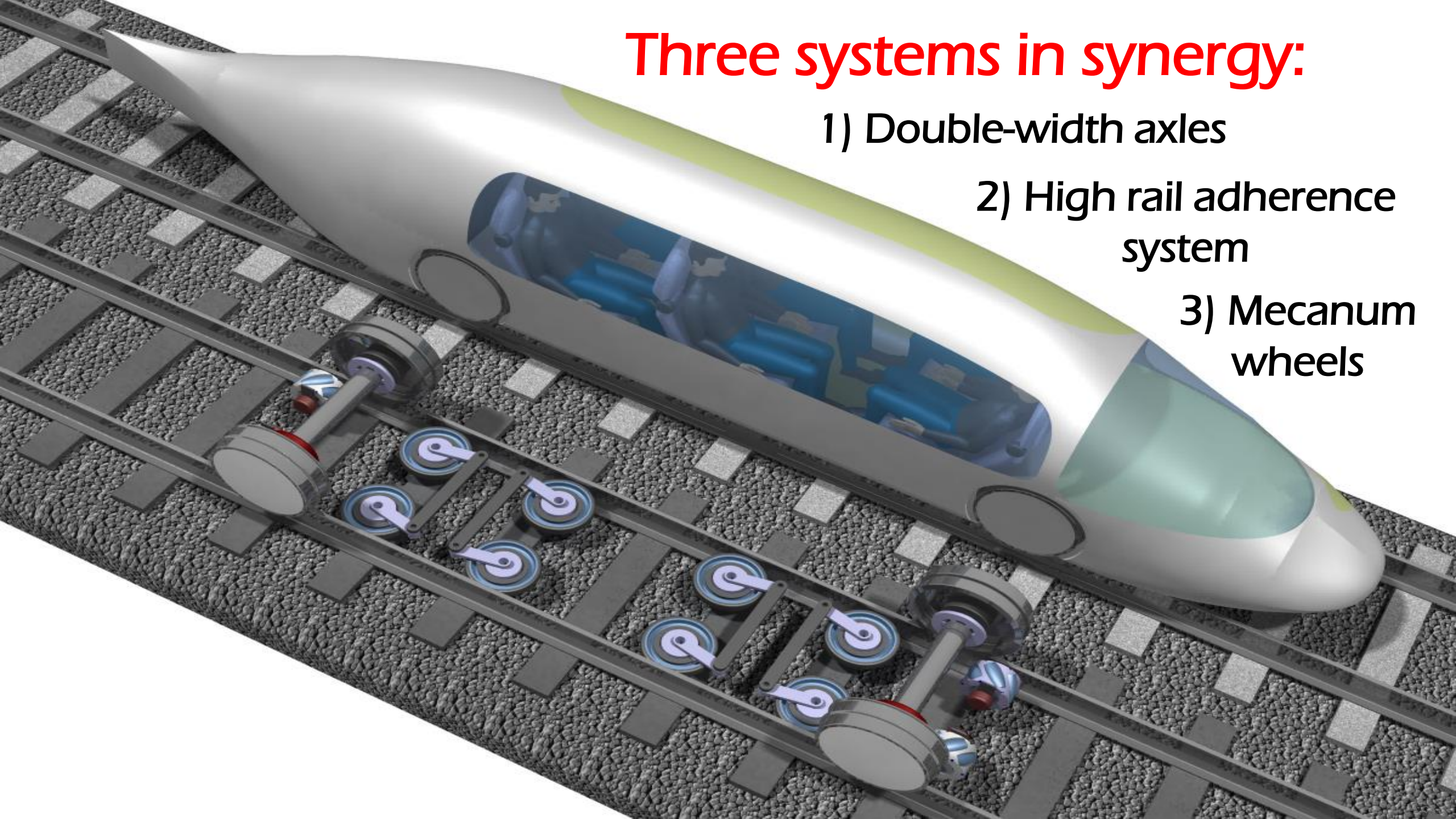
BUILD INNOVATE INVENT
PATENT PENDING
INVENT INNOVATE BUILD

## Dual vehicle

Six seats – 100 km/h – 3 kW

Equivalent consumption ~ 100 km/l = 235 mpg

- Fast and ultra efficient on rail
- Manoeuvres omnidirectionally at stations



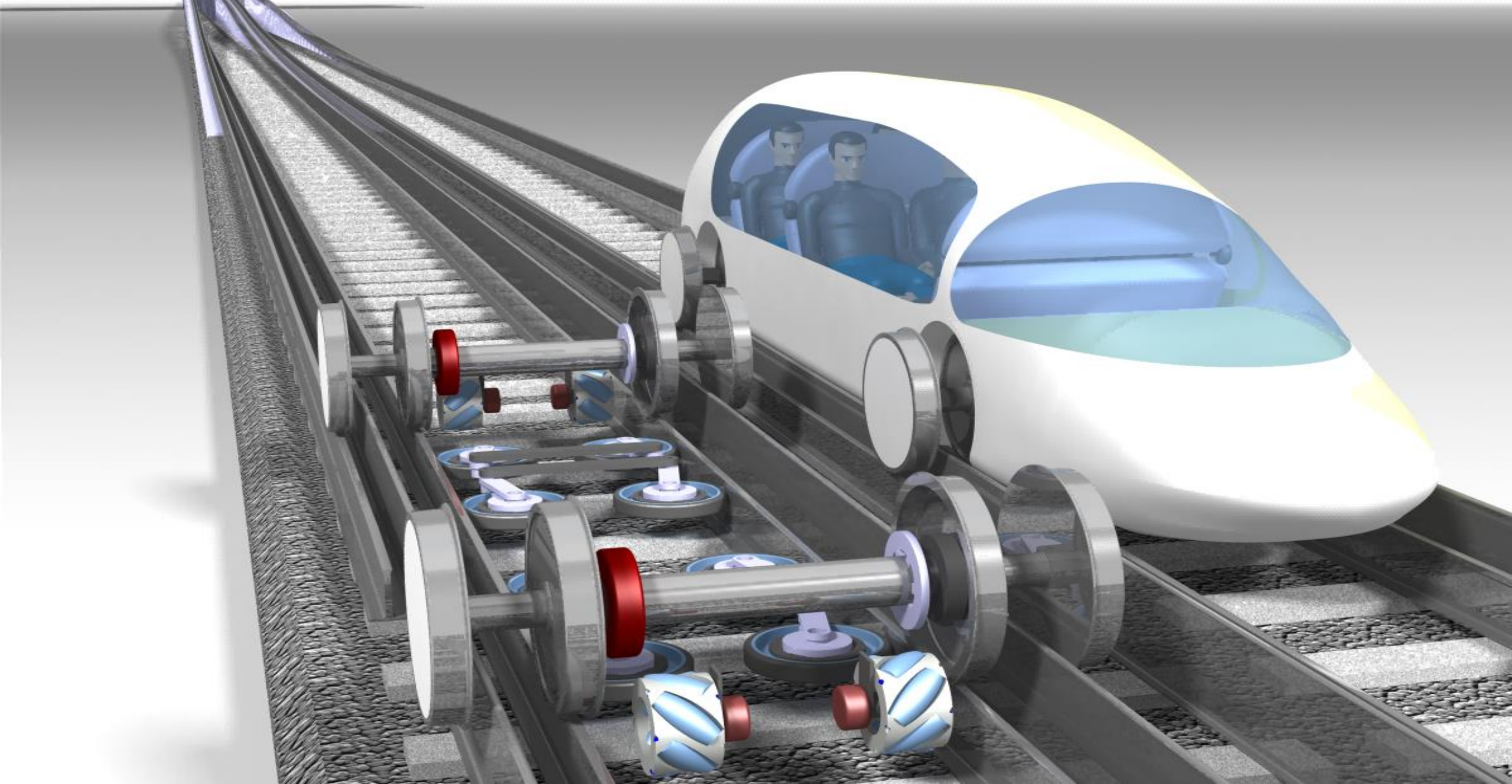
# Three systems in synergy:

1) Double-width axles

2) High rail adherence system

3) Mecanum wheels

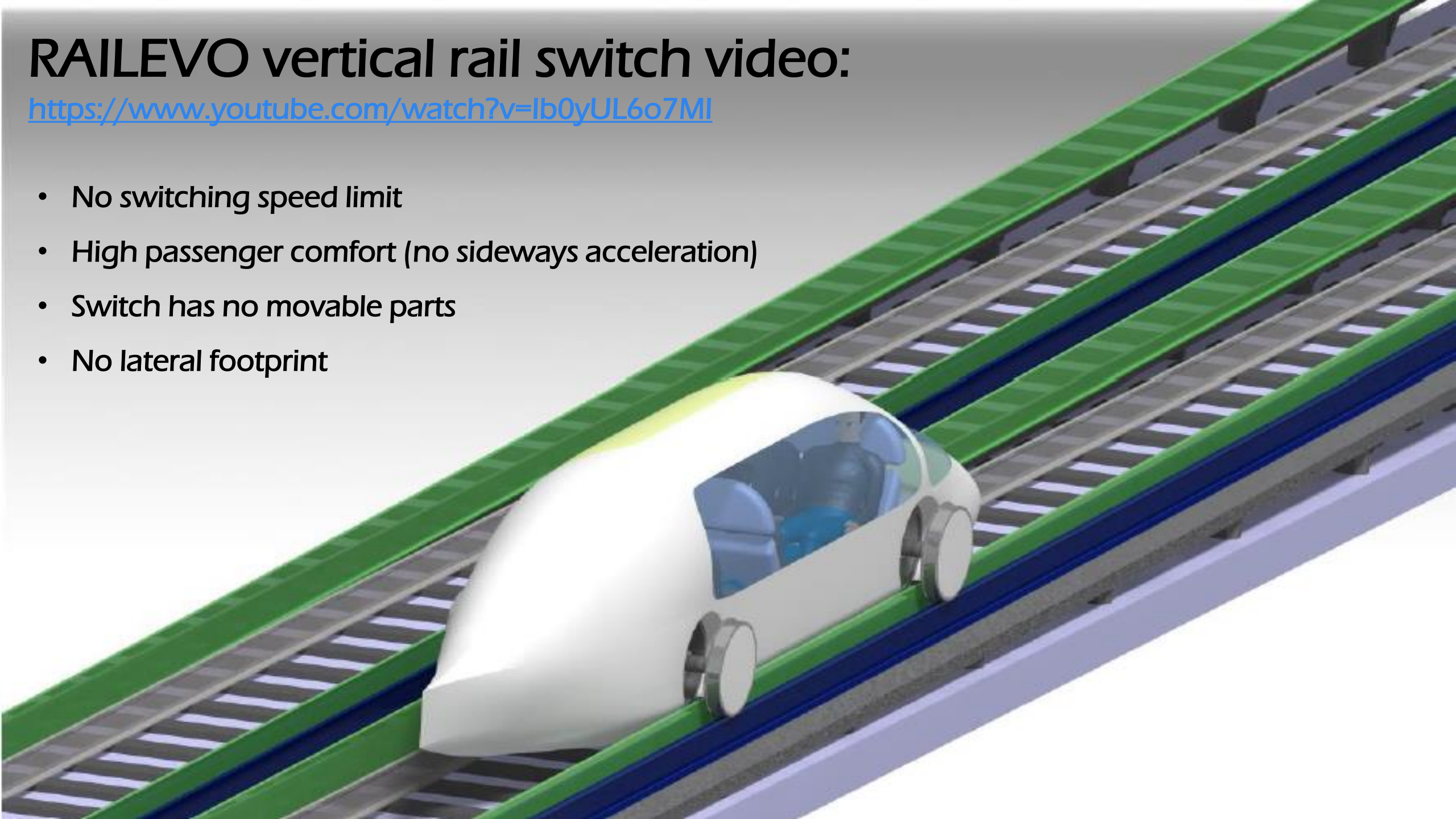
# a synergy of existing technologies



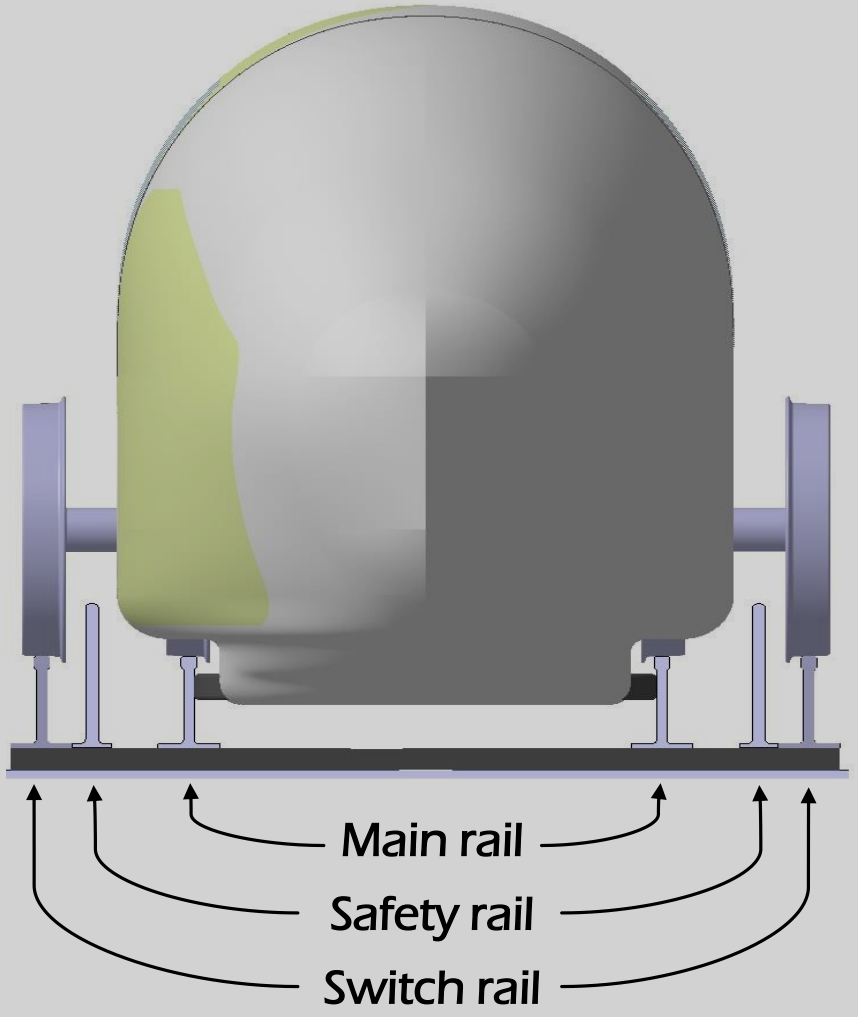
# RAILEVO vertical rail switch video:

https://www.youtube.com/watch?v=Ib0yUL6o7MI

- No switching speed limit
- High passenger comfort (no sideways acceleration)
- Switch has no movable parts
- No lateral footprint

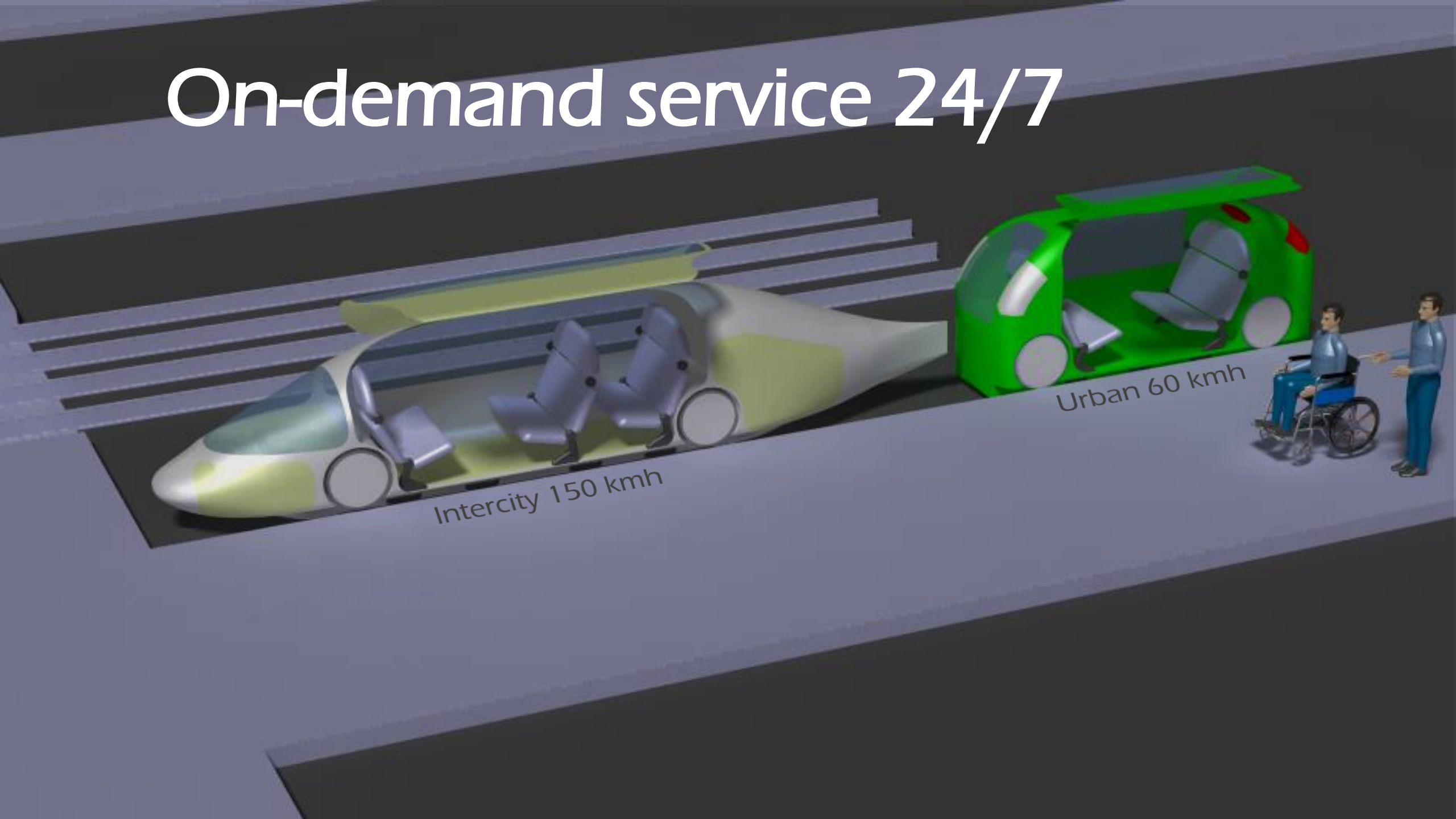


# The vertical rail switch



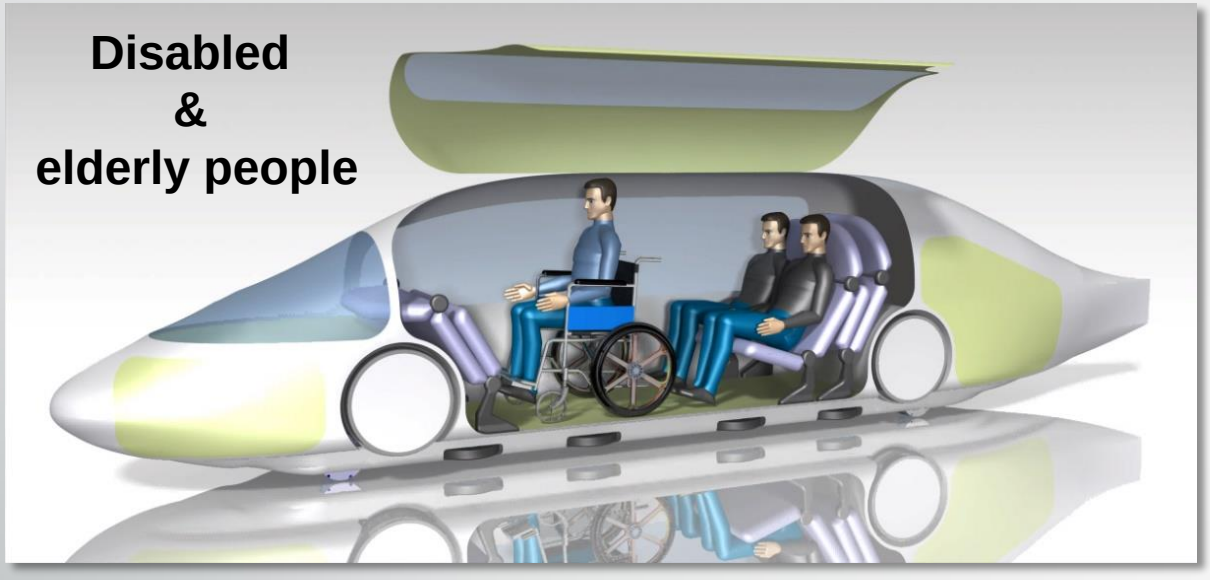

View of vehicle rear on rail section

# On-demand service 24/7

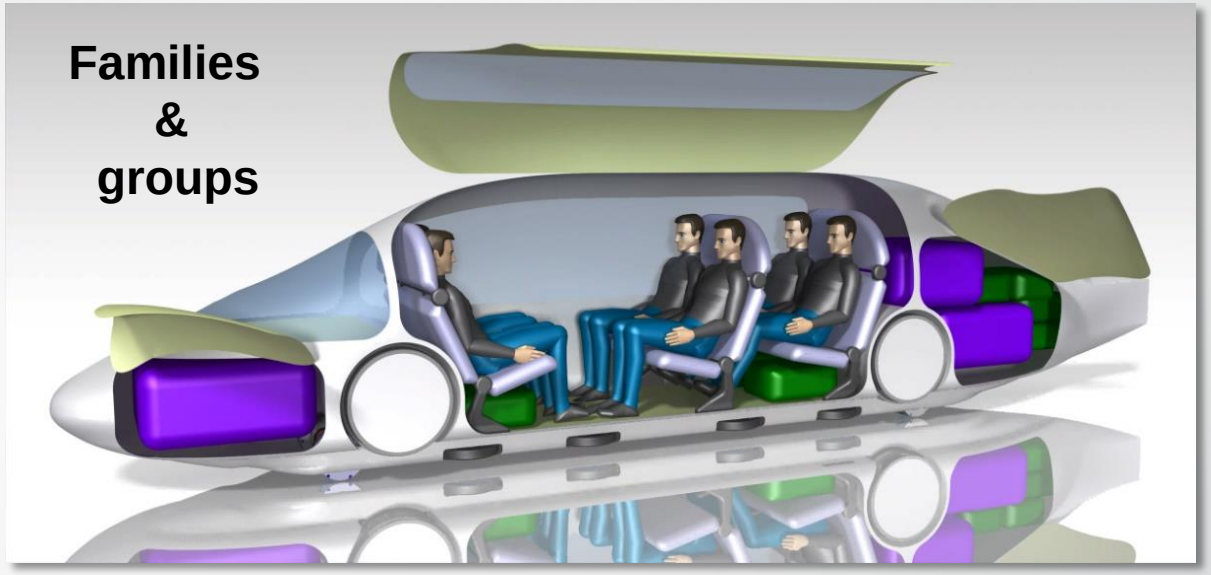


# Versatile cabin

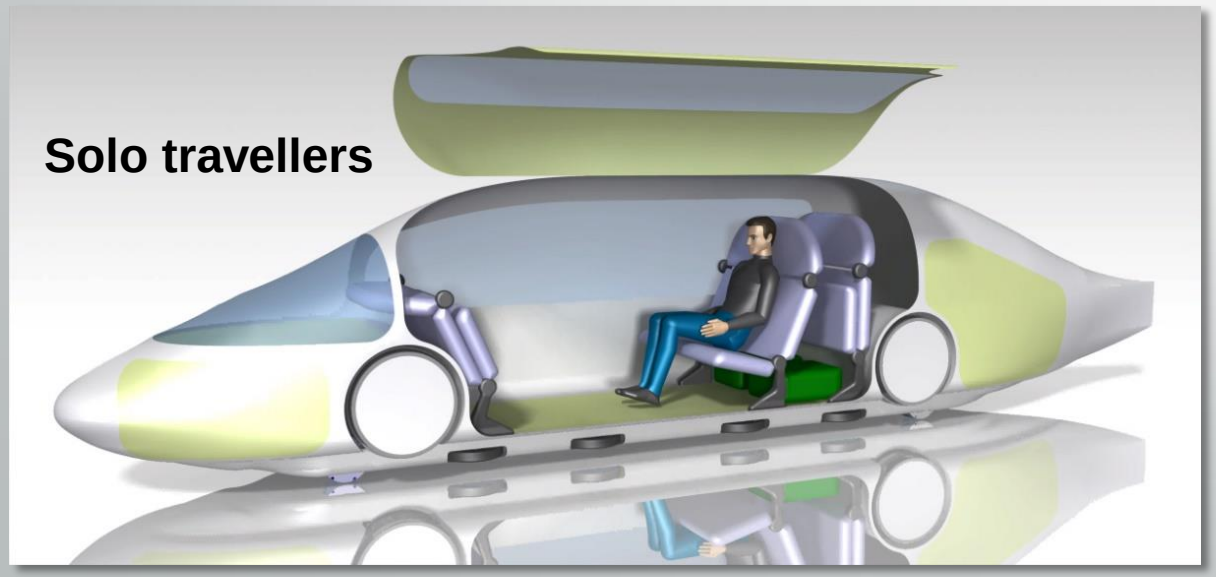
**Disabled & elderly people**



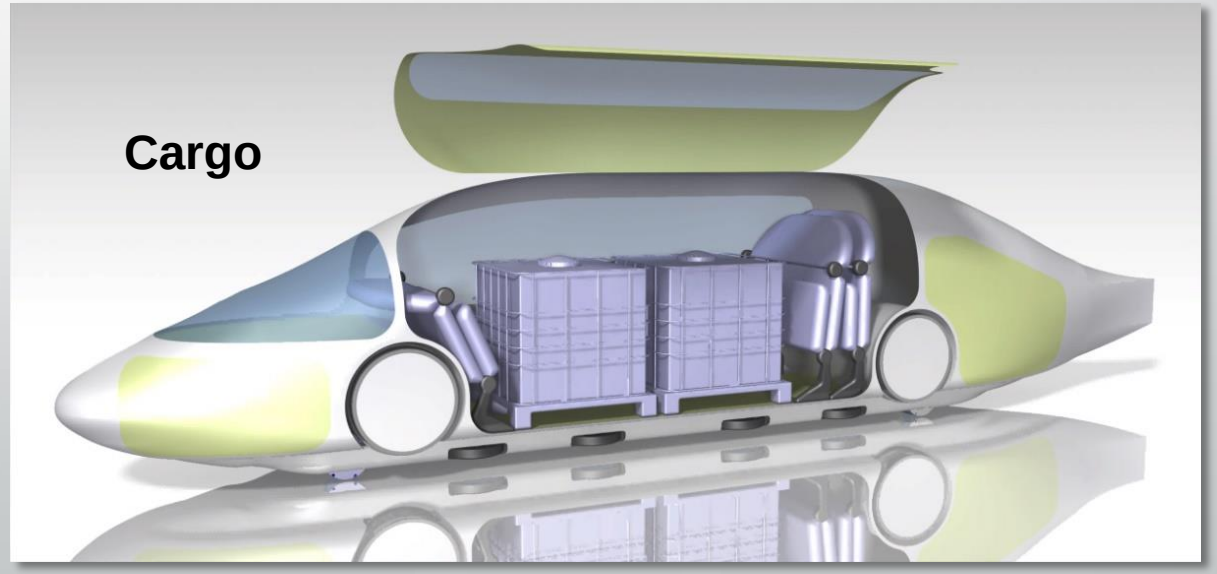
**Families & groups**



**Solo travellers**



**Cargo**

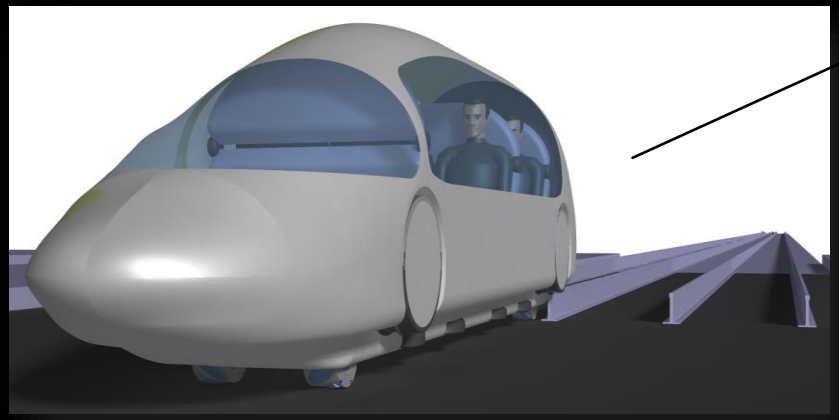


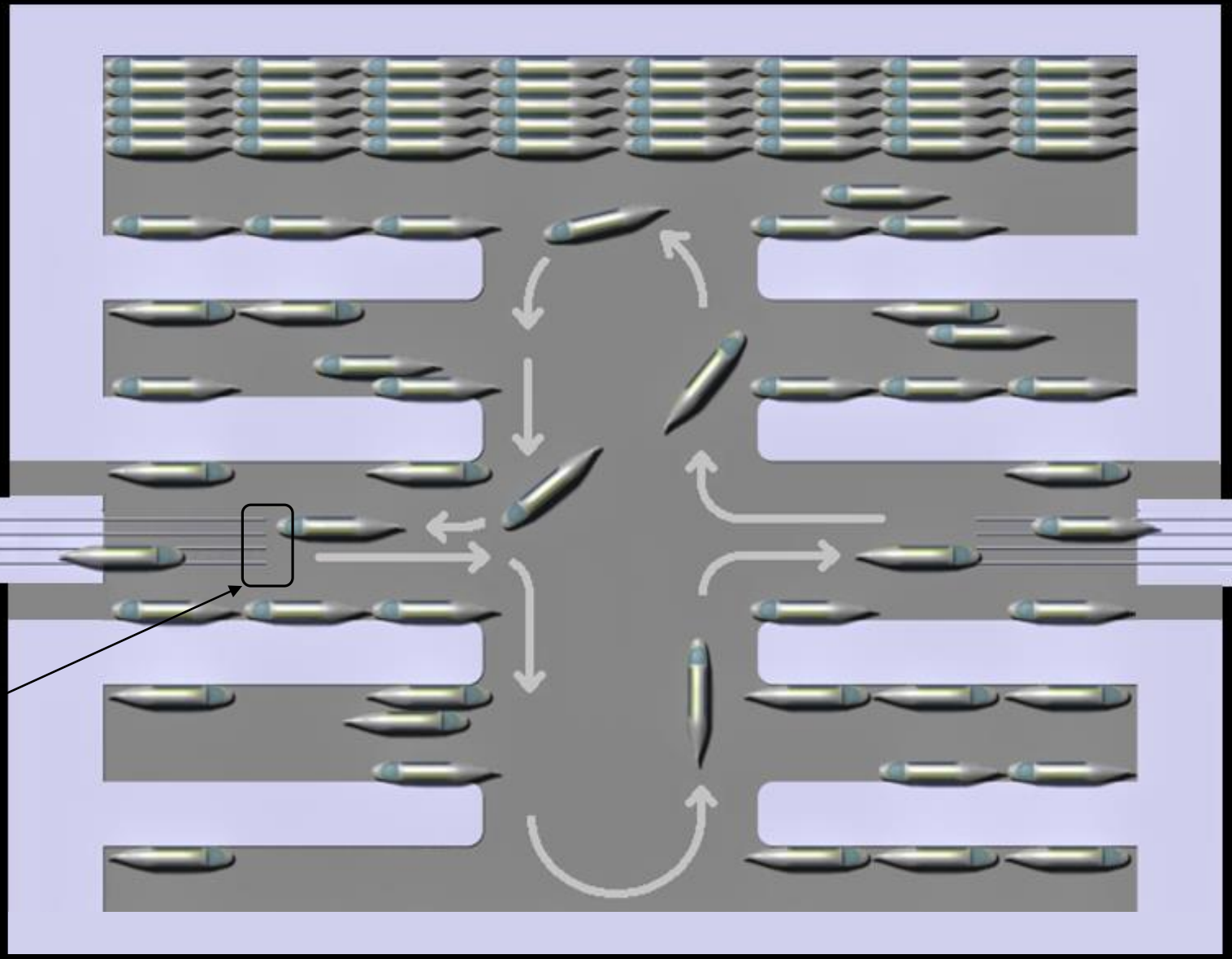
# Station

- High traffic capacity

  600 vehicles/h = 3600 seats/h

- Continuous flow of vehicles





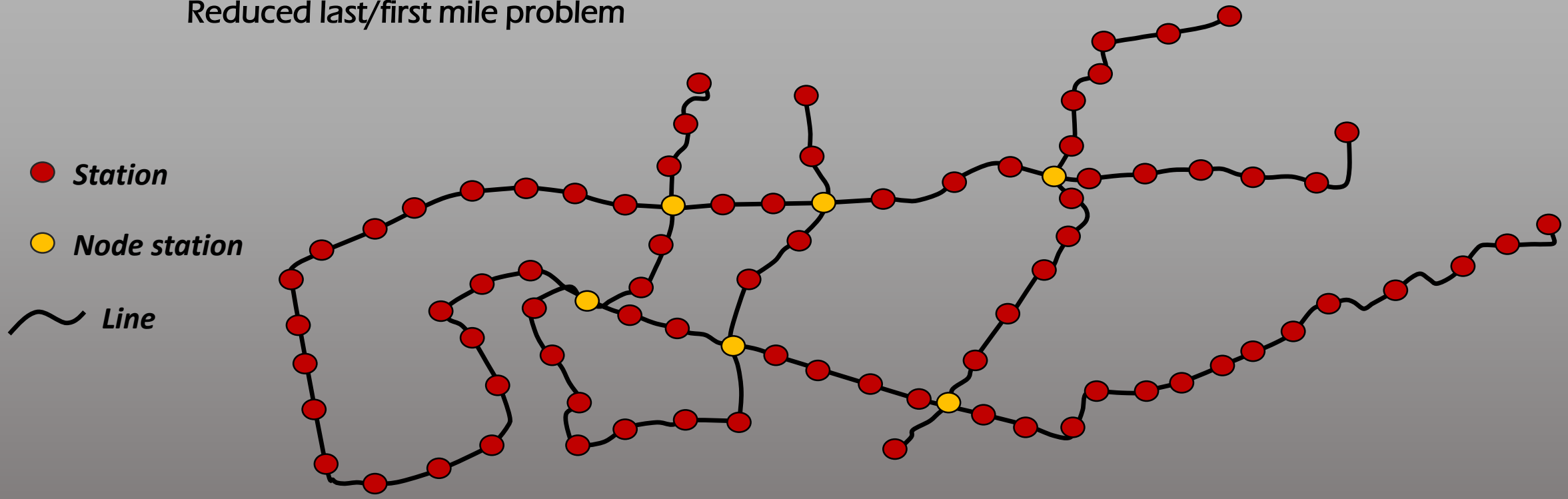
*75 m x 60 m*

*Like a small parking lot for supermarket*

# RAILEVO network

- Short travel times with non-stop travel from/to any station
- High station density on the line*

  Reduced last/first mile problem

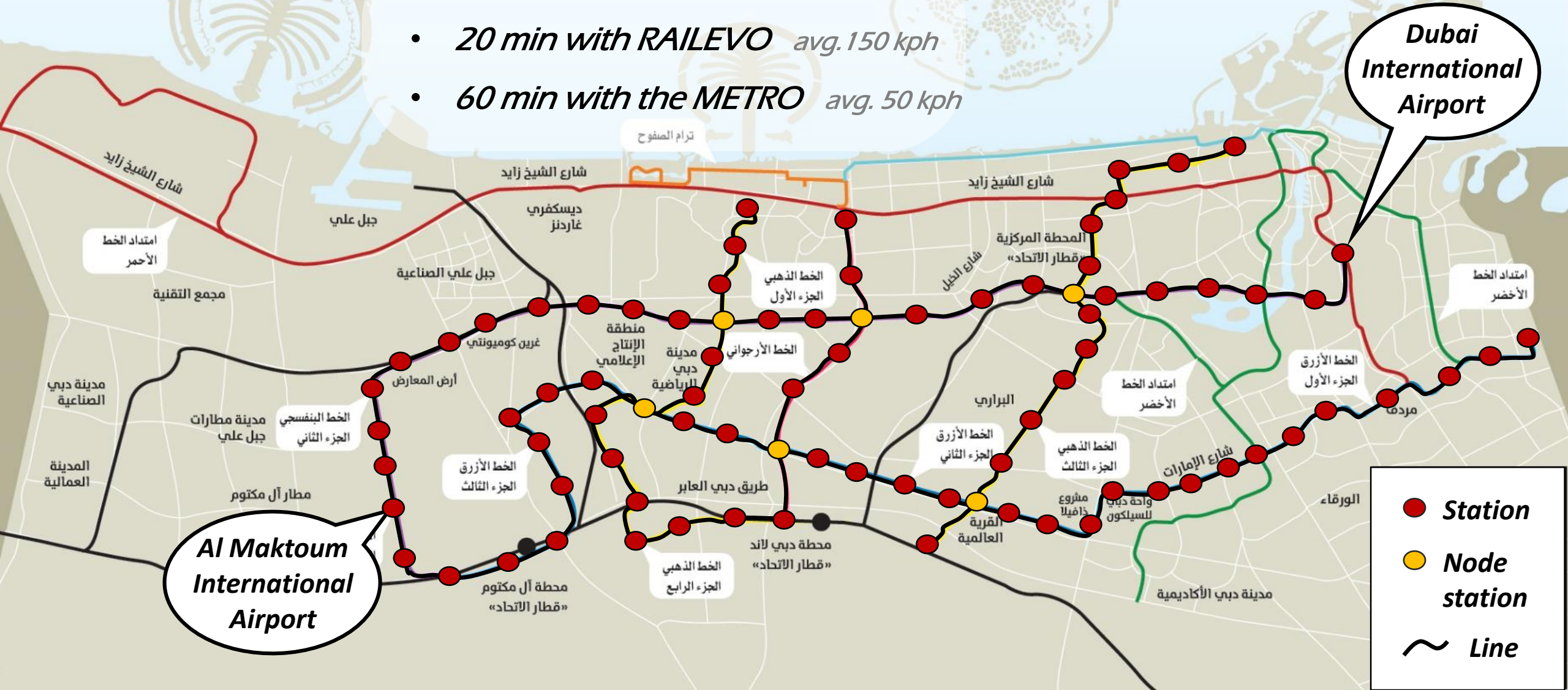



* a Metro system can't allow for too many stations because to be able to stop at any of them would make it too slow

# RAILEVO network proposal for Dubai

*Dubai int. – Al Maktoum int. 49km*

- *20 min with RAILEVO* *avg.150 kph*
- *60 min with the METRO* *avg. 50 kph*



# RAILEVO Proposal

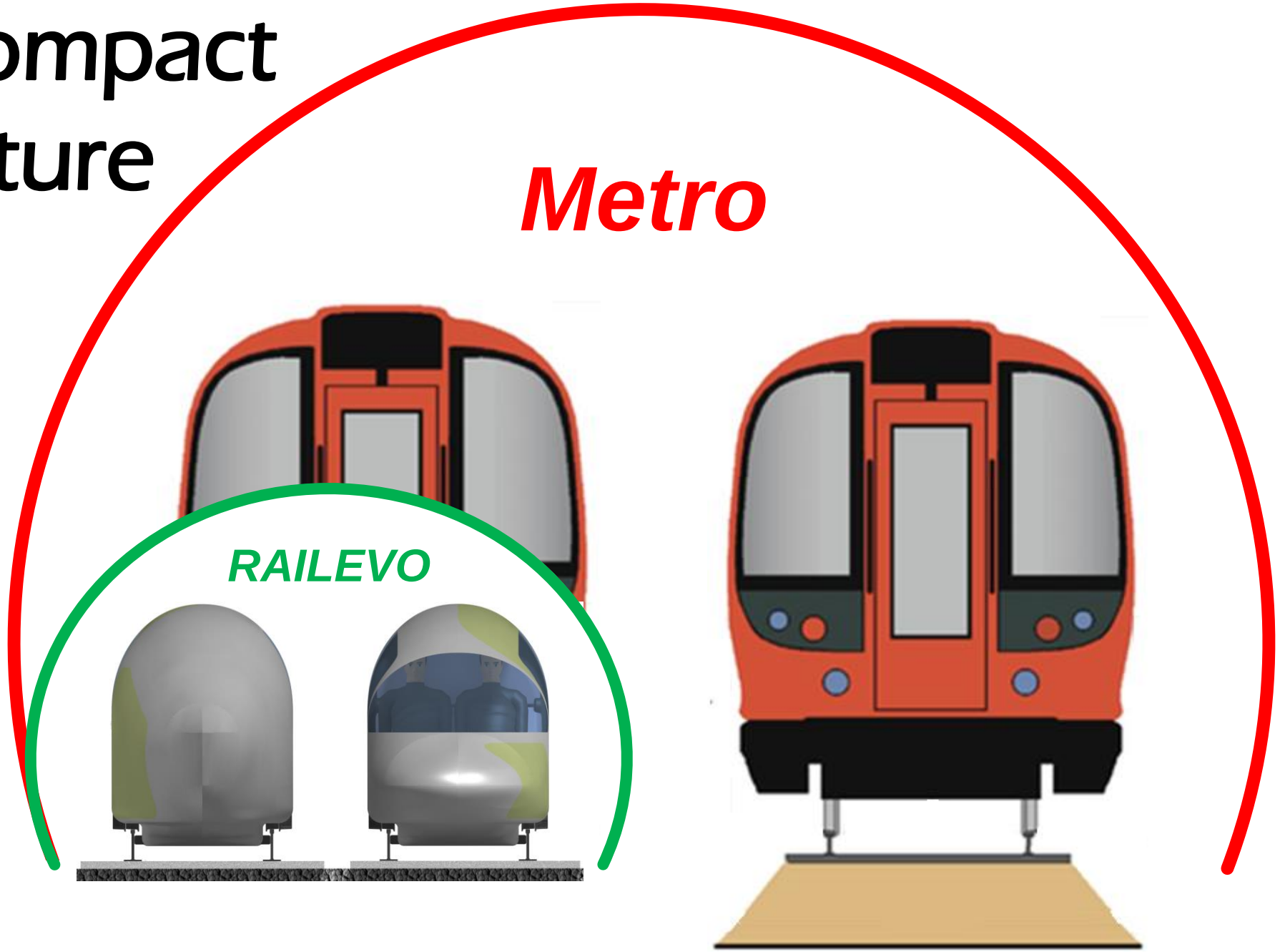
## Abu Dhabi ⟷ Dubai ~ 140 km / 200 kph

## 42 min

RAILEVO permits a high station density

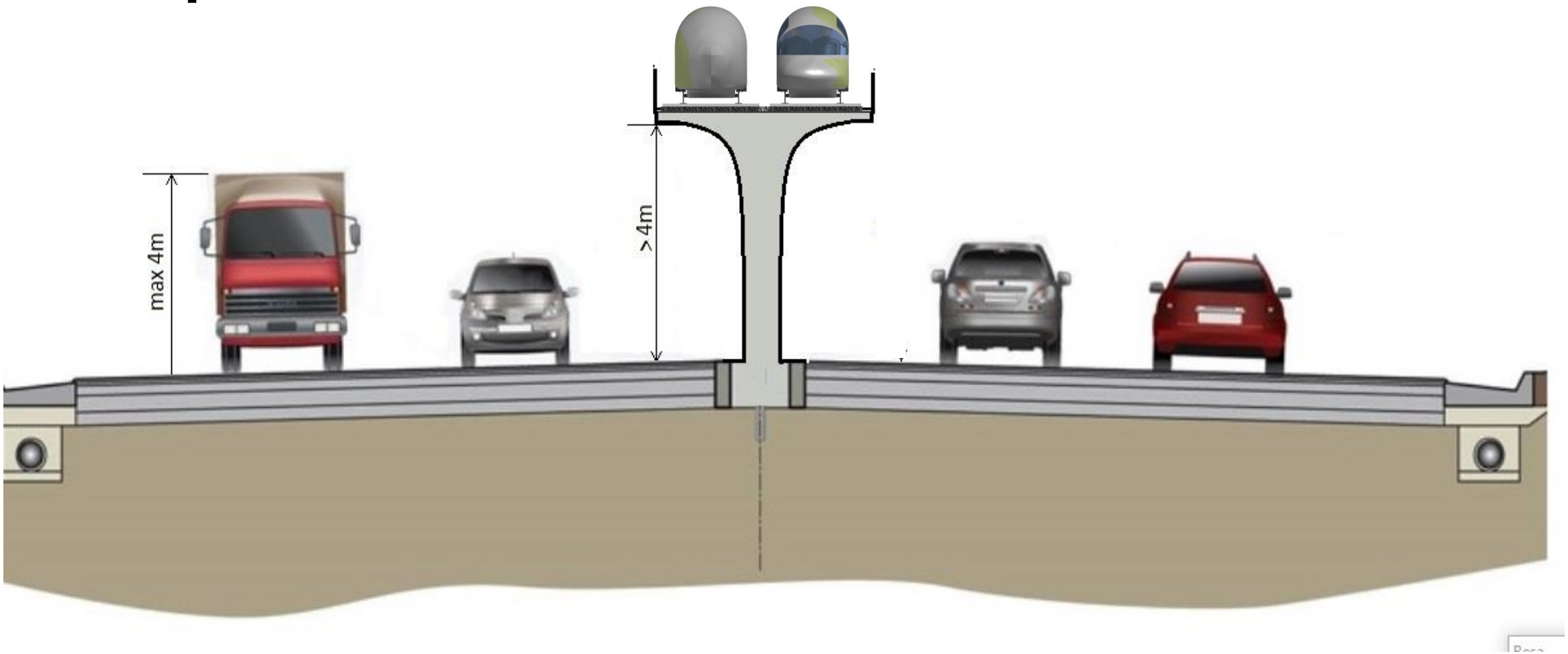

The land value around the line/stations would increase considerably

# Light & compact infrastructure



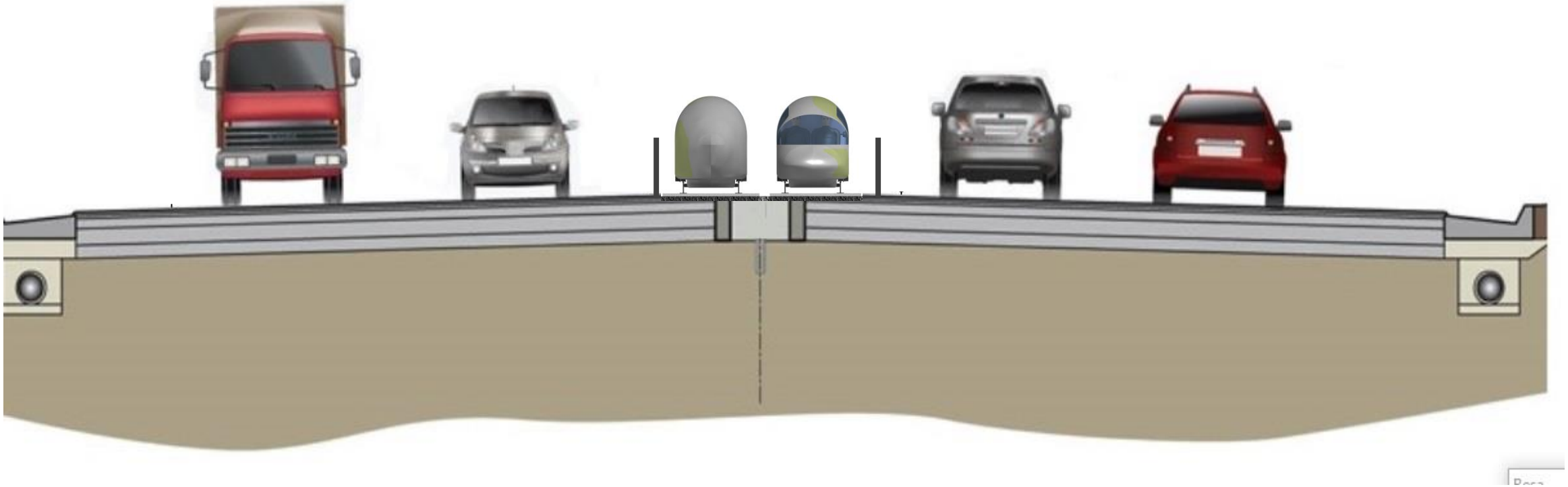
# Different construction possibilities:

## Suspended



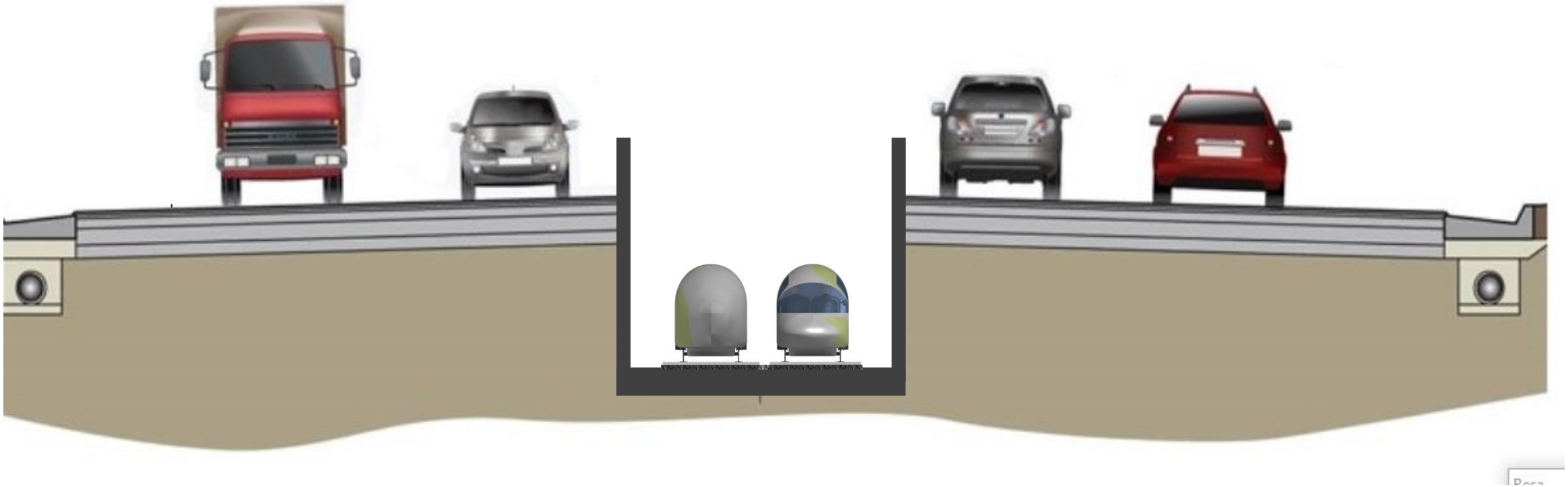
# Different construction possibilities:

## Regular



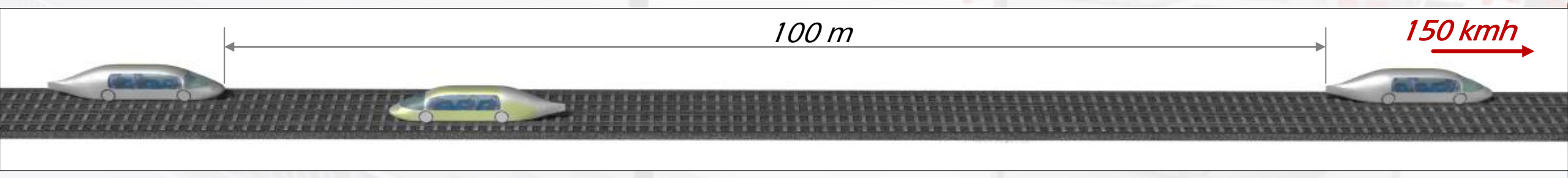
# Different construction possibilities:

## Trench



# Continuous traffic flow = High throughput

Vehicles maintain the same speed at safe distances




**Speed on the line: 150 kmh**

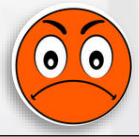
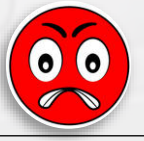
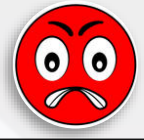
Safety distance: 100 m ≈ one every 2,4 sec

Maximum flow **in each direction**: 1500 vehicles/h == **up to 9000 seats/h**

⇩

**Equivalent to ~ 15 Metro/h**

# Comparison with other means of transport

| Route length | 10 km | | | | 100 km | | |
|---|---|---|---|---|---|---|---|
| Means of transport |  RAILEVO |  Metro/Train |  E-Cars | |  RAILEVO |  HS trains |  E-Cars |
| 1 Travel time |  |  |  | |  |  |  |
| 2 Last/first mile problem |  |  |  | |  |  |  |
| 3 Travel cost |  |  |  | |  |  |  |
| 4 Infrastructure cost |  |  |  | |  |  |  |
| 5 Sustainability |  |  |  | |  |  |  |

# COMPETITOR


- Obtrusive suspended infrastructure
- Constrained traffic management capability

# MARKET

Transportation market growth follows demographic growth

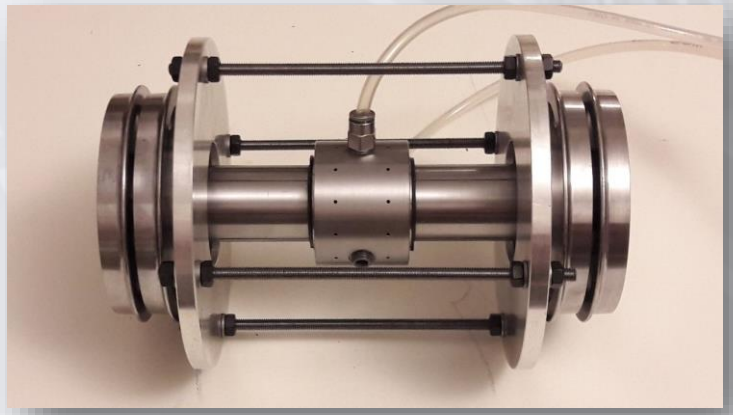
50 B$/year for new railway infrastructure market from: *marketsandmarkets.com*

# RAILEVO proposes:

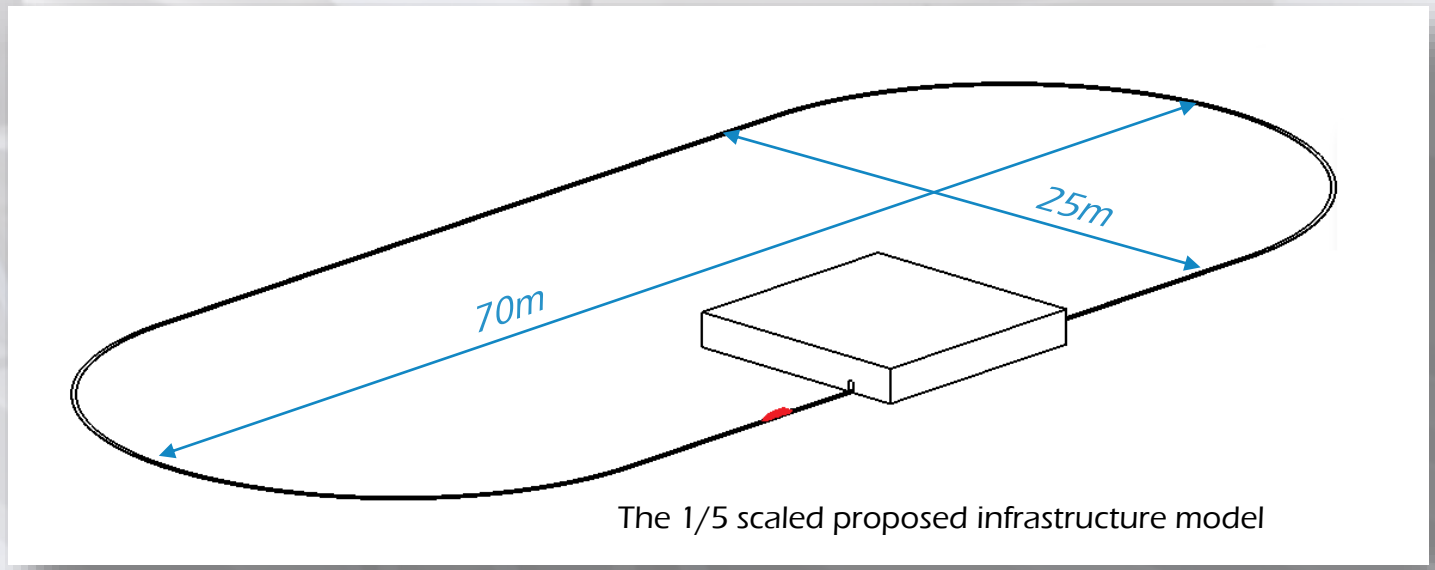
1. A smart alternative to conventional railway infrastructures
2. Effective people mover, especially between airports and cities
3. Retrofit of obsolete single-track railways to a RailEvo double-track

# Next steps for 2020

- Patent extensions in the countries of interest
- Traffic management virtual simulator
- 1/5 scaled prototype of vehicle and infrastructure



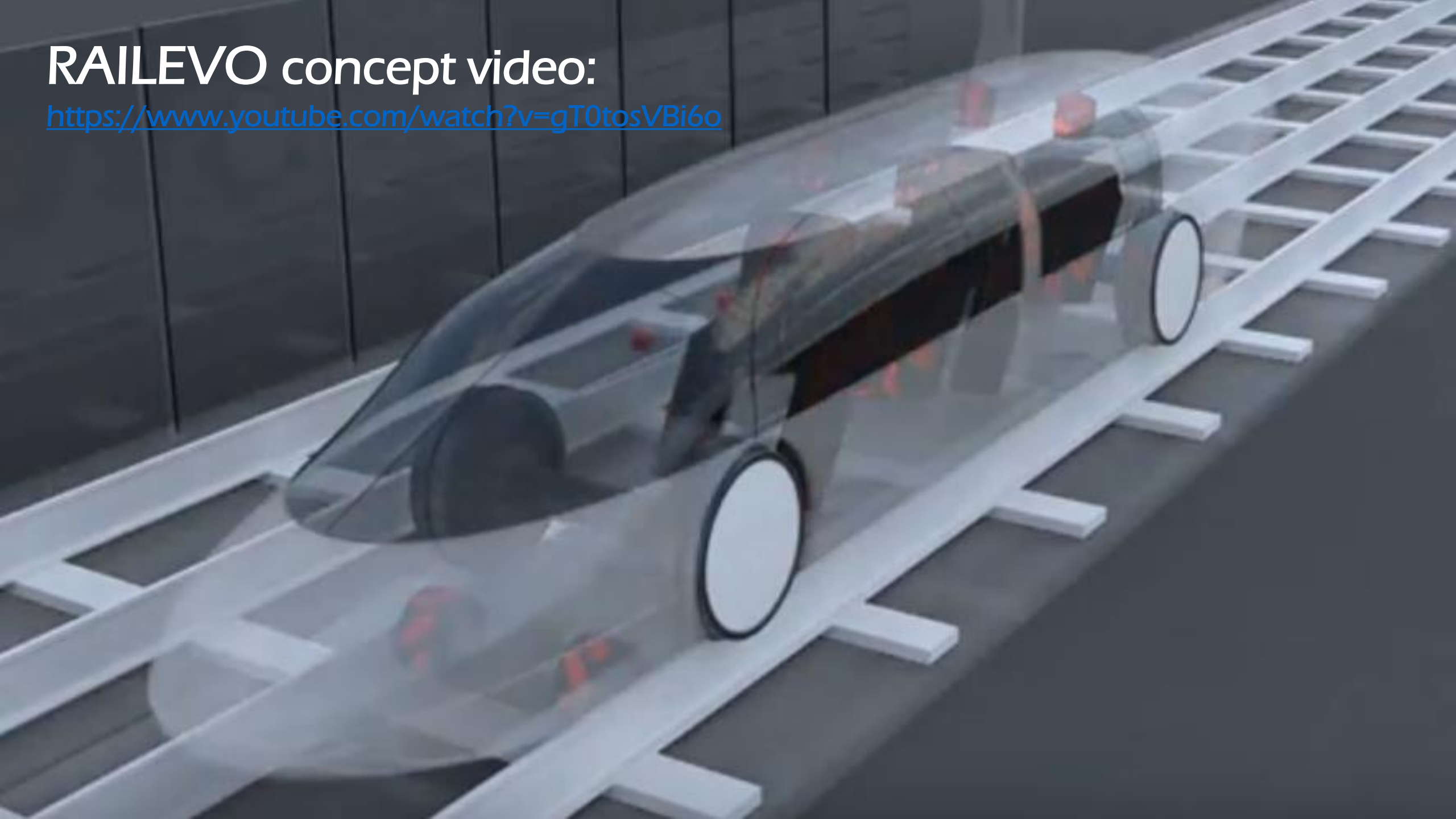
The fully working 1/5 scaled double-width axle

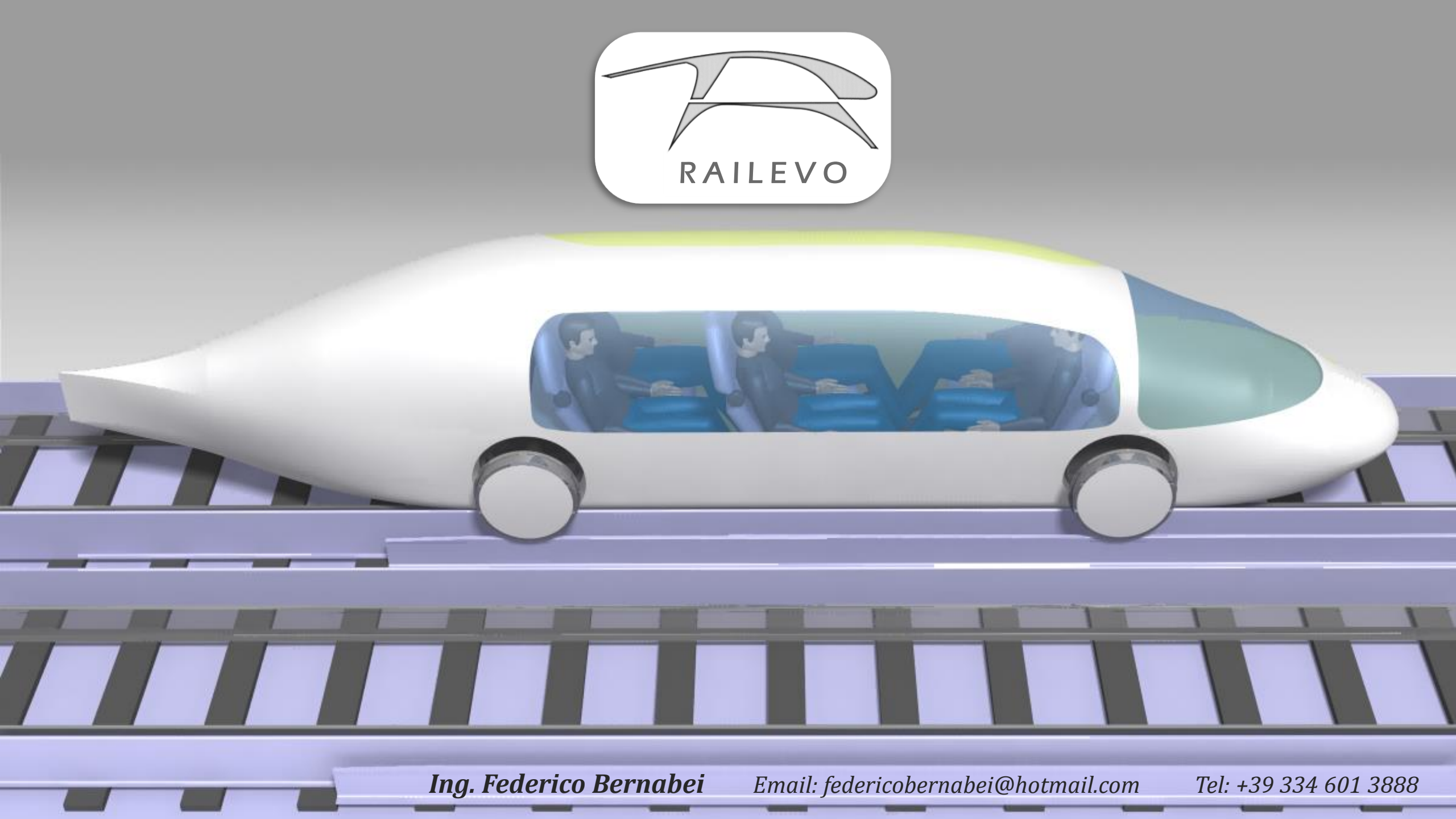



The 1/5 scaled proposed infrastructure model

# RAILEVO concept video:

https://www.youtube.com/watch?v=gT0tosVBi6o






***Ing. Federico Bernabei*** *Email: federicobernabei@hotmail.com* *Tel: +39 334 601 3888*