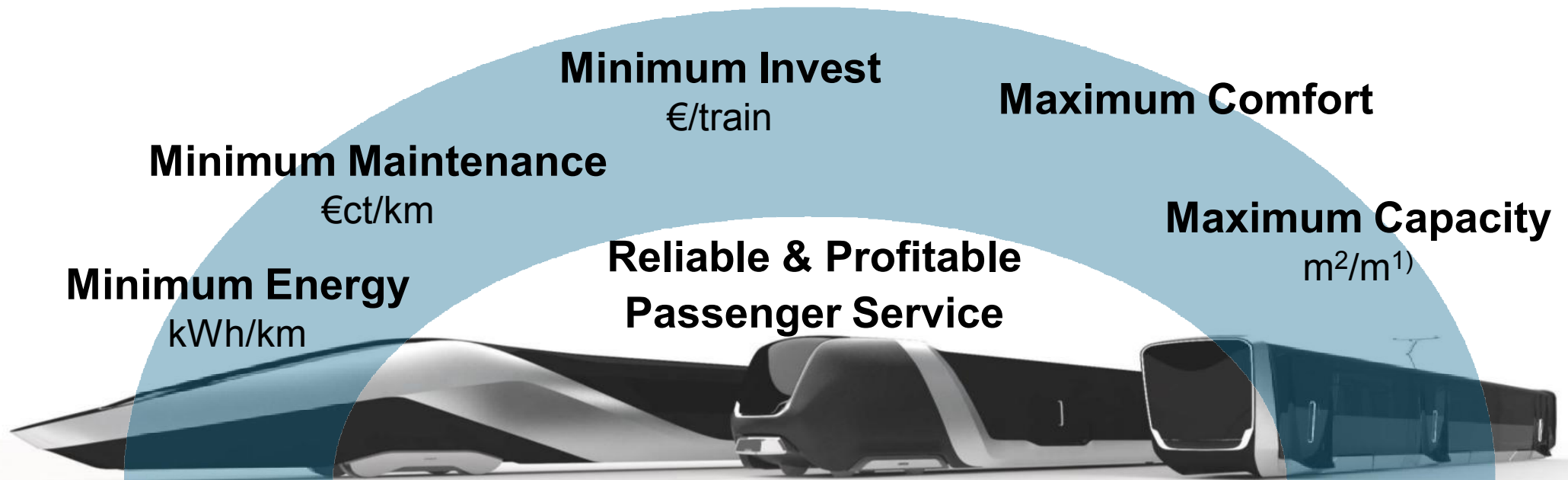




3rd World Conference on Telecoms
Paris, 17.05.2017
Train on the Future
Matthias Maier

Decisive requirements on trains from operator's perspective



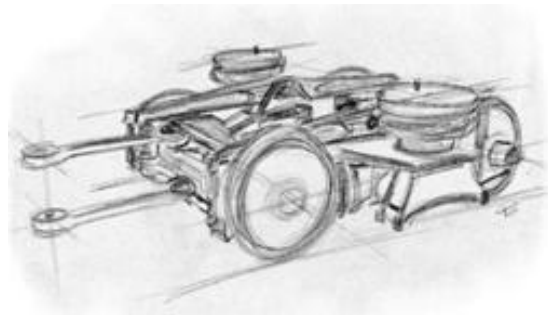
The focus of our innovation roadmap for trains is the improvement of Life-Cycle-Cost

1) Effective area/ train length
Unrestricted © Siemens AG 2017

Innovations in coming Velaro projects will focus on further improvement of Life-Cycle-Cost

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Today's challenges



Innovative concepts / solutions



- **Reduction of Energy Consumption**

- Reduction of aerodynamic drag
- Reduction of train set weight
- Increase Energy Efficiency

- **Reduction of Maintenance Cost**

1) Permanent magnet motor

- Fully housed bogie
- Closed vehicle roof
- Lightweight body shell design
- PEM¹⁾ technology
- Electric brake → reduction of conventional brake equipment
- Increase of maintenance intervals

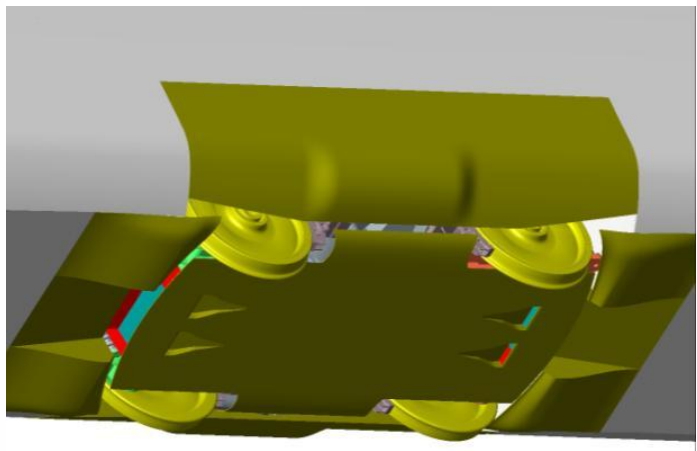
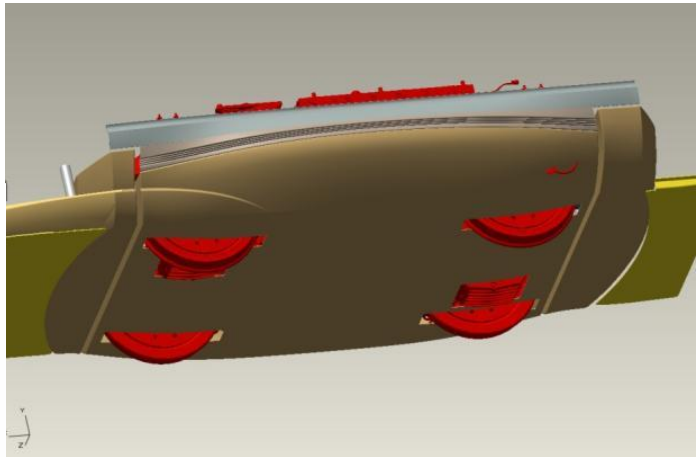
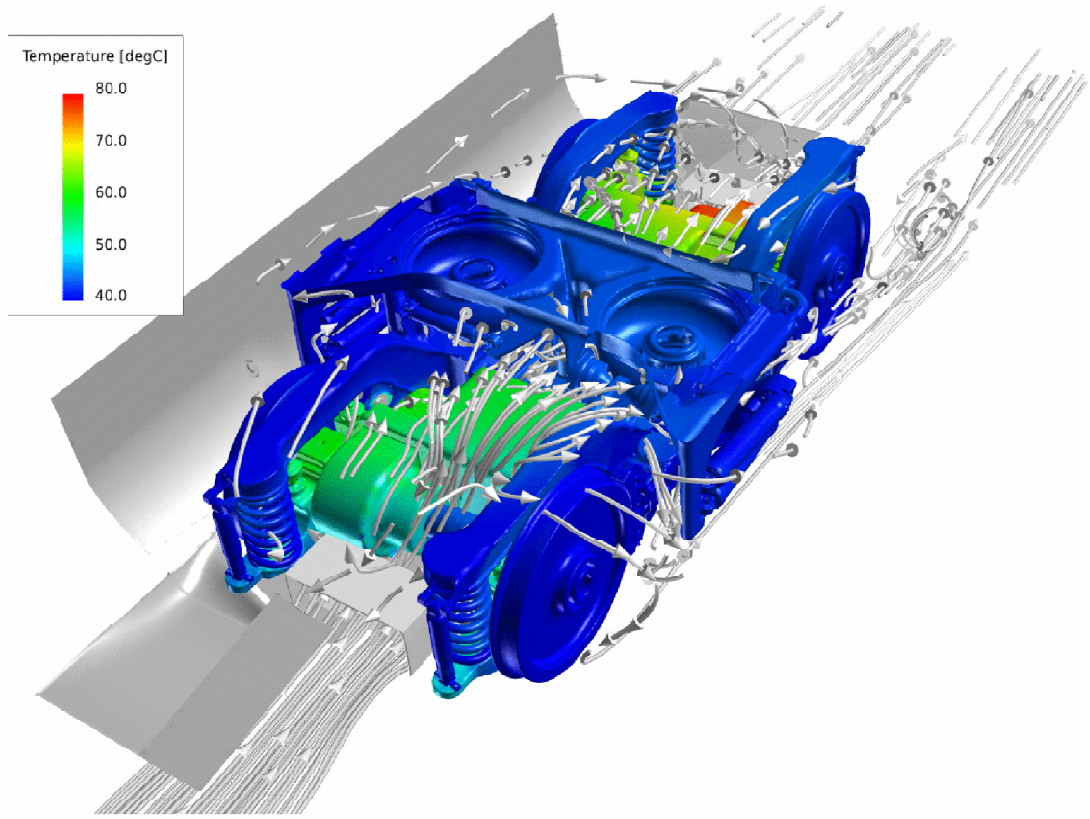
Reduction of Energy Consumption

Aerodynamic drag is one major driver for energy consumption of high-speed trains



Effect on Energy Consumption

Full bogie housing	- 15%
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Reduction of Energy Consumption

The field test of the PEM

in Velaro Russia shows good results

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Energy Consumption for SPB-MSK #767 27-04-2015 15:00 - 18:45



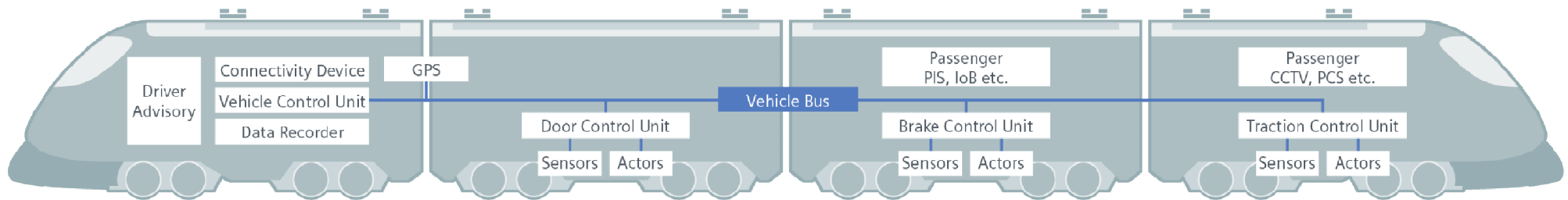
Effect on Energy Consumption

PEM

- 5%

Reduction of Maintenance Cost by using intelligent solutions like Railigent®

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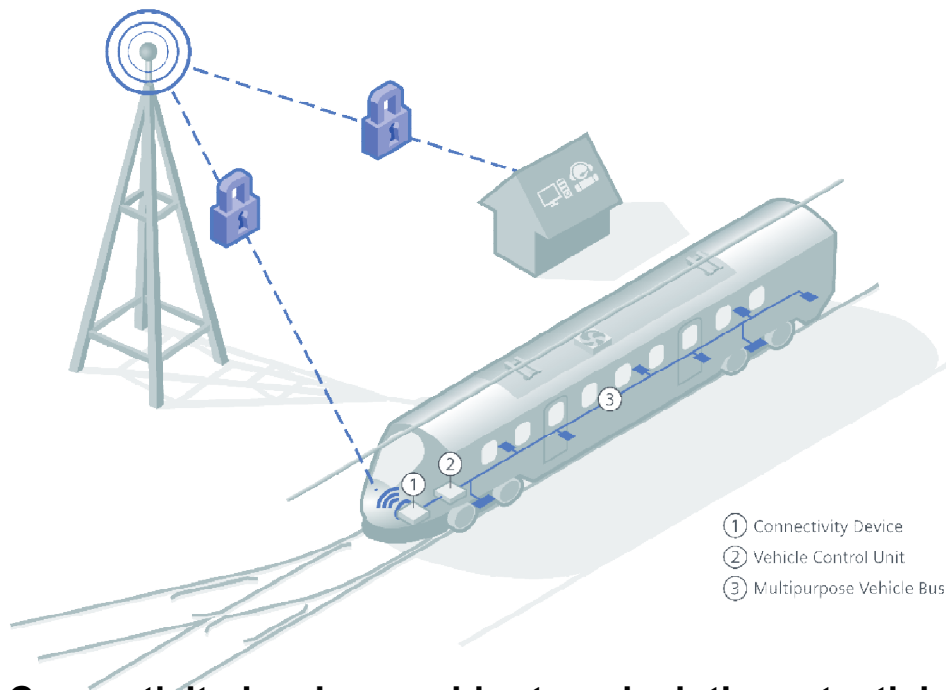
	Origin	Type
1.	Vehicle Comp. Unit (VCU)	Status / Process / Diagnostic data
2.	Vehicle Bus (MVB)	Command / Protocol / Process data
3.	Subsystems CU's	Status / Process / Diagnostic unit data
4.	Data Recorder (OTMR/JRU)	Status / protocol messages
5.	Sensors	Various types
6.	Driver HMI+Advisory	Crew messages

	Origin	type
7.	CCTV	Video download / streaming
8.	PCS, PIS, etc.	Passenger data
9.	Infotainment	Media download
10.	Internet-on-Board	Public Internet access
11.	Conductor app's	Conductor data

There are many potential sources of data on the vehicle
Most valuable diagnostic data is stored in VCU and Sub-CU's

Reduction of Maintenance Cost by using intelligent solutions like Railigent®

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Connectivity is a key enabler to unlock the potential of Digital Services for Rolling Stock by proving valuable system & diagnostic data

Unrestricted © Siemens AG 2017

1) Acquire data

- Integrate to multi-purpose vehicle bus and to vehicle control systems in a safe manner
- Acquire comprehensive vehicle data that really matters and adds value

2) Prepare data

- Process data onboard to reduce transmission volume
- Store data temporarily to cater for lower bandwidth or communication break-downs

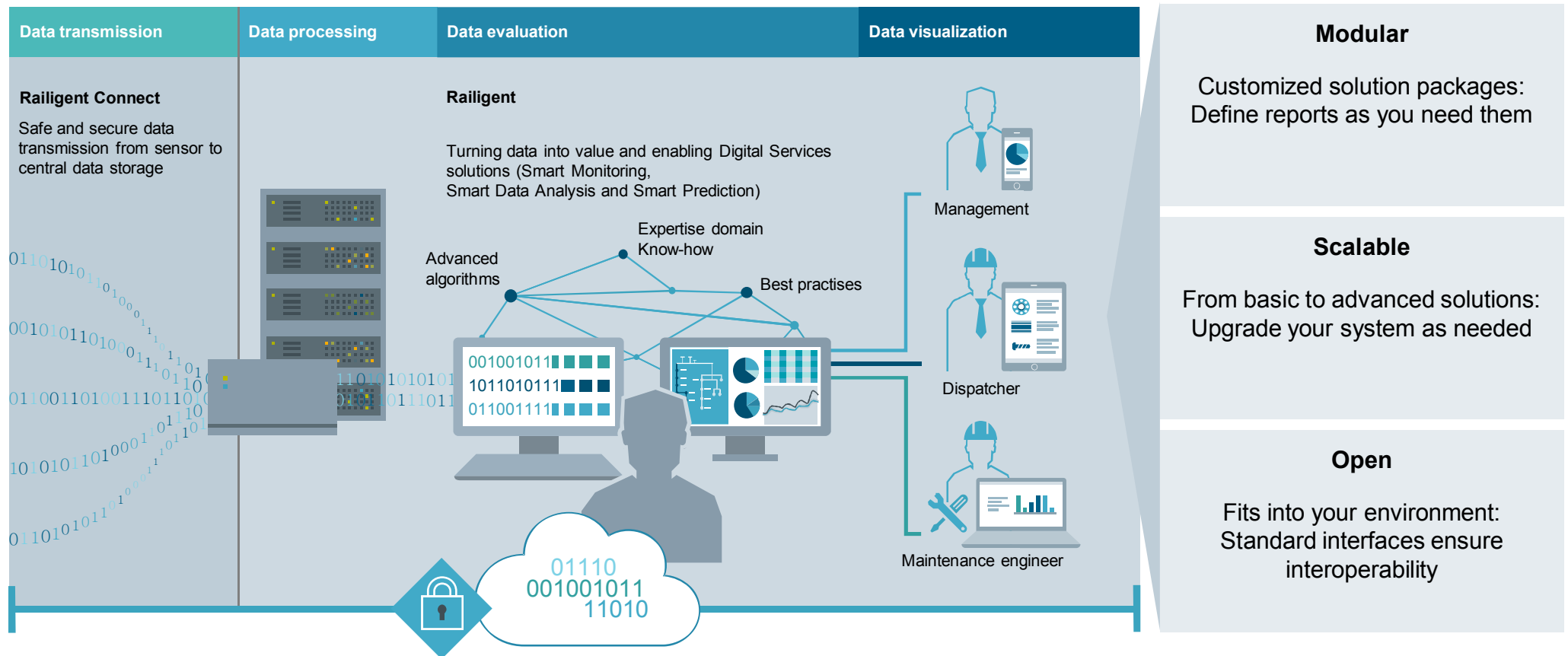
3) Transmit data

- Transmit operational and process data continuously as far as possible
- Transmit data in a highly secure manner with focus on confidentiality, integrity, availability

Reduction of Maintenance Cost

Railigent® - The platform to manage assets smarter

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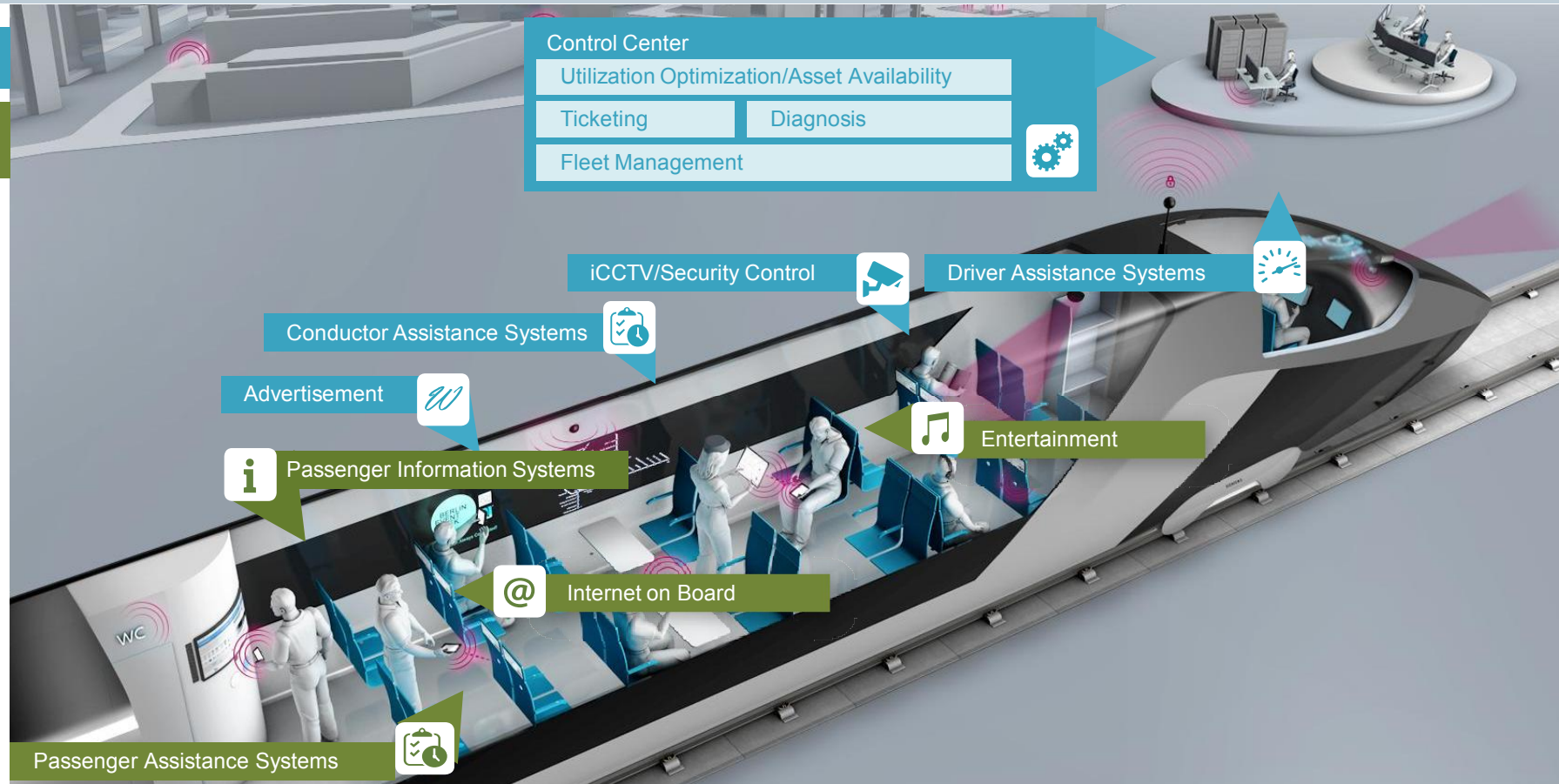
Train IT – Platform to be Always Connected!

Solutions for seamless mobility – for passengers and operators

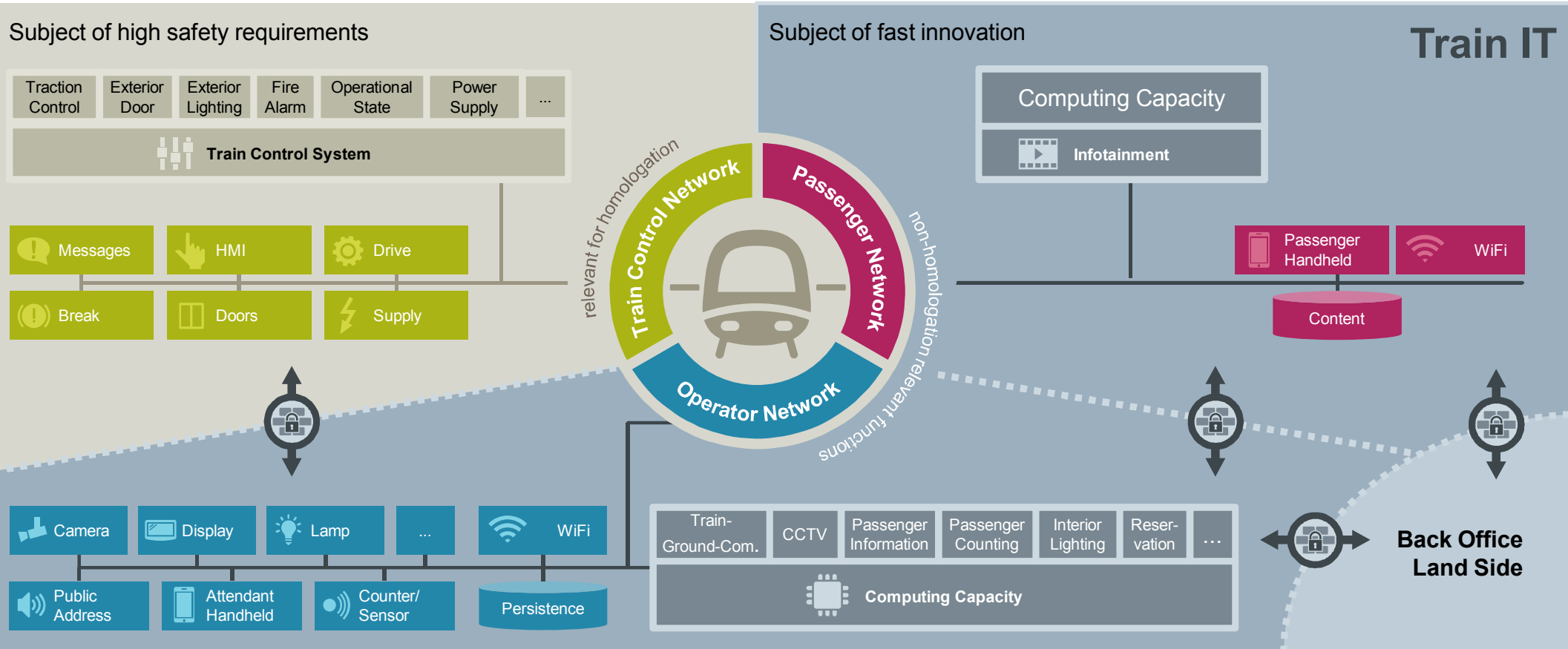
SIEMENS

Solutions for Train Operators

Solutions for Passengers



Train IT: Separation in homologation and non-homologation relevant systems enables faster innovations



Operational experience is the key to innovation

1.8 Billion km in operation and never stopping

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Spain: Velaro E
Spanish Railways RENFE
26 Trainsets (2001 + 2005)
V = 350 kph



UK / France: Velaro EU
Eurostar / Eurotunnel
16 Trainsets (400 m)
(2010 + 2014)
V = 320 kph



Germany: Velaro D
Deutsche Bahn AG
17 Trainsets (2008)
V = 320 kph



Russia: Velaro RUS
Russian Railways RZD
16 Trainsets (250 m)
(2006 + 2011)
V = 250 kph

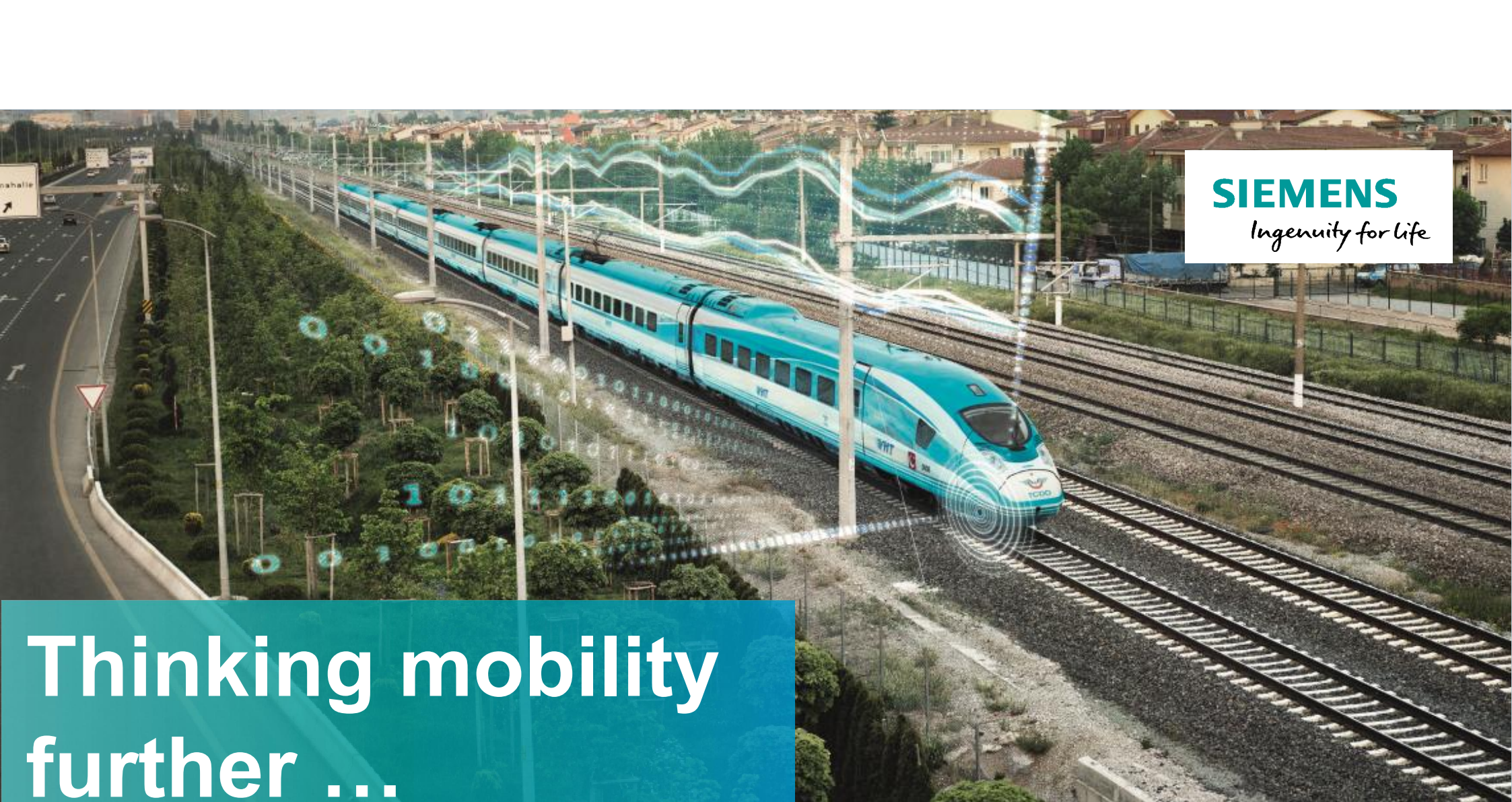


Turkey: Velaro TR
TCDD
1 + 6 Trainsets (2013)
V = 300 kph



China: Velaro CN
China Railway Corporation
> 800 Trainsets (2005...2016)
V = 300 up to 380 kph





SIEMENS
Ingenuity for life

Thinking mobility further ...

Thank you.

Matthias Maier

Sales Director

High-Speed & Intercity Trains

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