

# Vienna goes UTO

## Challenges & Opportunities of an Upgrade-Project



Die Stadt gehört Dir.



Nikolaus Panzera  
28.11.2017

# Agenda



## I. Project Overview

- a. Network & Expansions
- b. Facts & Figures

## II. Technical Details

- a. From STO to UTO
- b. Train Control Today & Tomorrow

## III. Challenges & Opportunities

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# I. Project Overview | Network & Expansions





# I. Project Overview | Facts & Figures



## U5 line:

- Karlsplatz-Frankhplatz
- 1 new station
- 2 km reconstruction
- 0,5 km new line
- reconstruction of existing U2-line's inner city section
- to be opened in 2023

# I. Project Overview | Facts & Figures

- 1<sup>st</sup> construction phase:  
New interchange station *Rathaus*
  - **U5** *Karlsplatz – Frankhplatz*
  - **U2** *Seestadt – Matzleinsdorfer Platz*
- **U5** will be operated driverless



- U5 is the „missing link“ in Vienna’s metro system
- decision for realization of **U2/U5** expansion in March 2014
- decision for UTO in June 2015

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
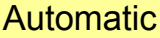














## ➤ Technical Details

- a. From STO to UTO
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## III. Challenges & Opportunities



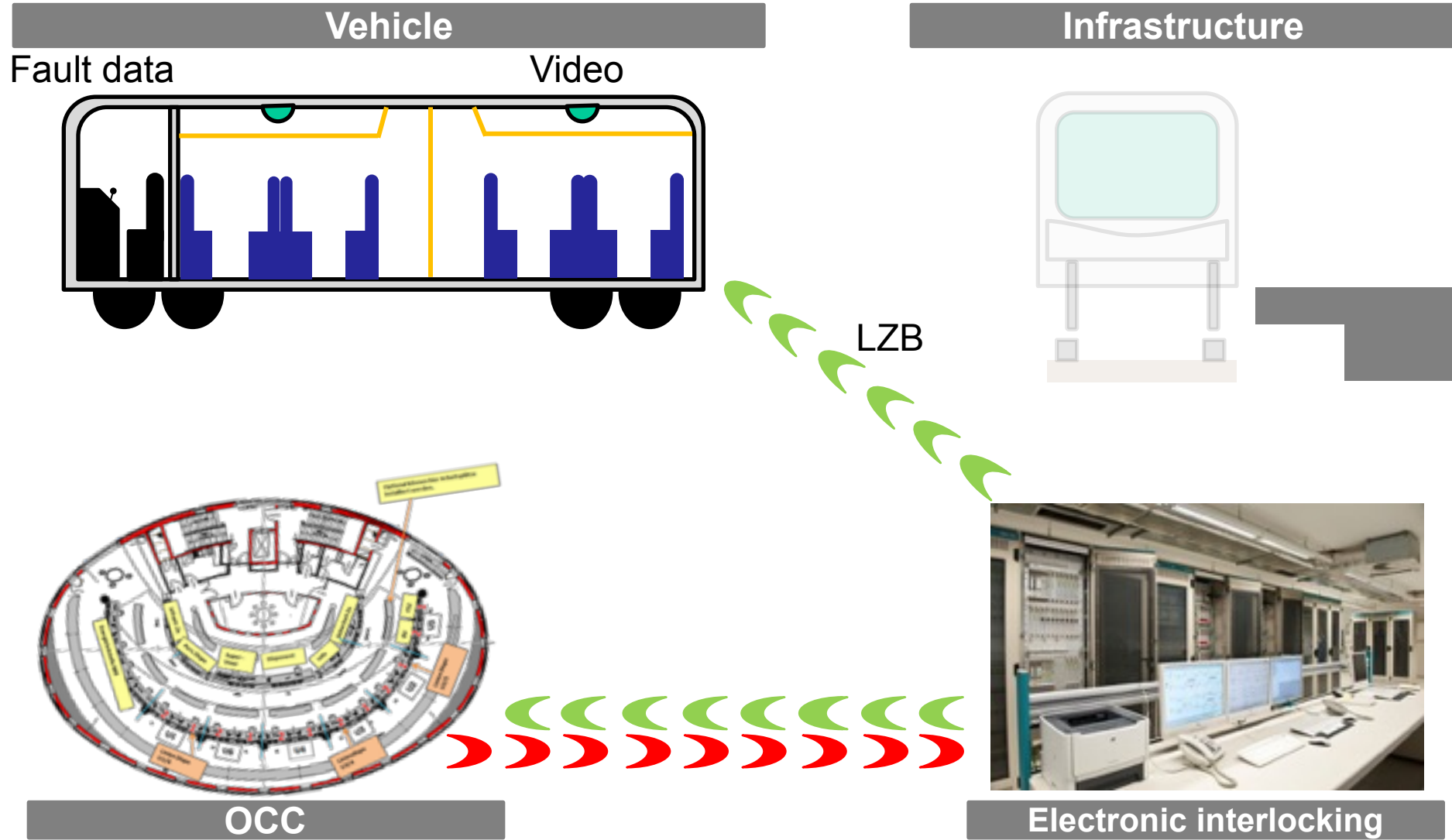
# II. Technical Details| From STO to UTO

Grade of Automation (GoA)	type of train operation	setting train in motion	move and stop the train	door closure	dealing with disruptions
 <b>GoA 1</b>	<b>ATP</b> <i>Automatic Train Protection</i>	 Driver	 Driver	 Driver	 Driver
 <b>GoA 2</b>	<b>STO</b> <i>Semi-Automatic Train Operation</i>	 Driver  Automatic	 <b>Automatik</b>	 Driver	 Driver
 <b>GoA 3</b>	<b>DTO</b> <i>Driverless Train Operation</i>	 Automatic	 Automatic	 Automatic  Attendant	 In Attendant
 <b>GoA 4</b>	<b>UTO</b> <i>Unattended Train Operation</i>	 Automatic	 Automatic	 Automatic	 Automatic

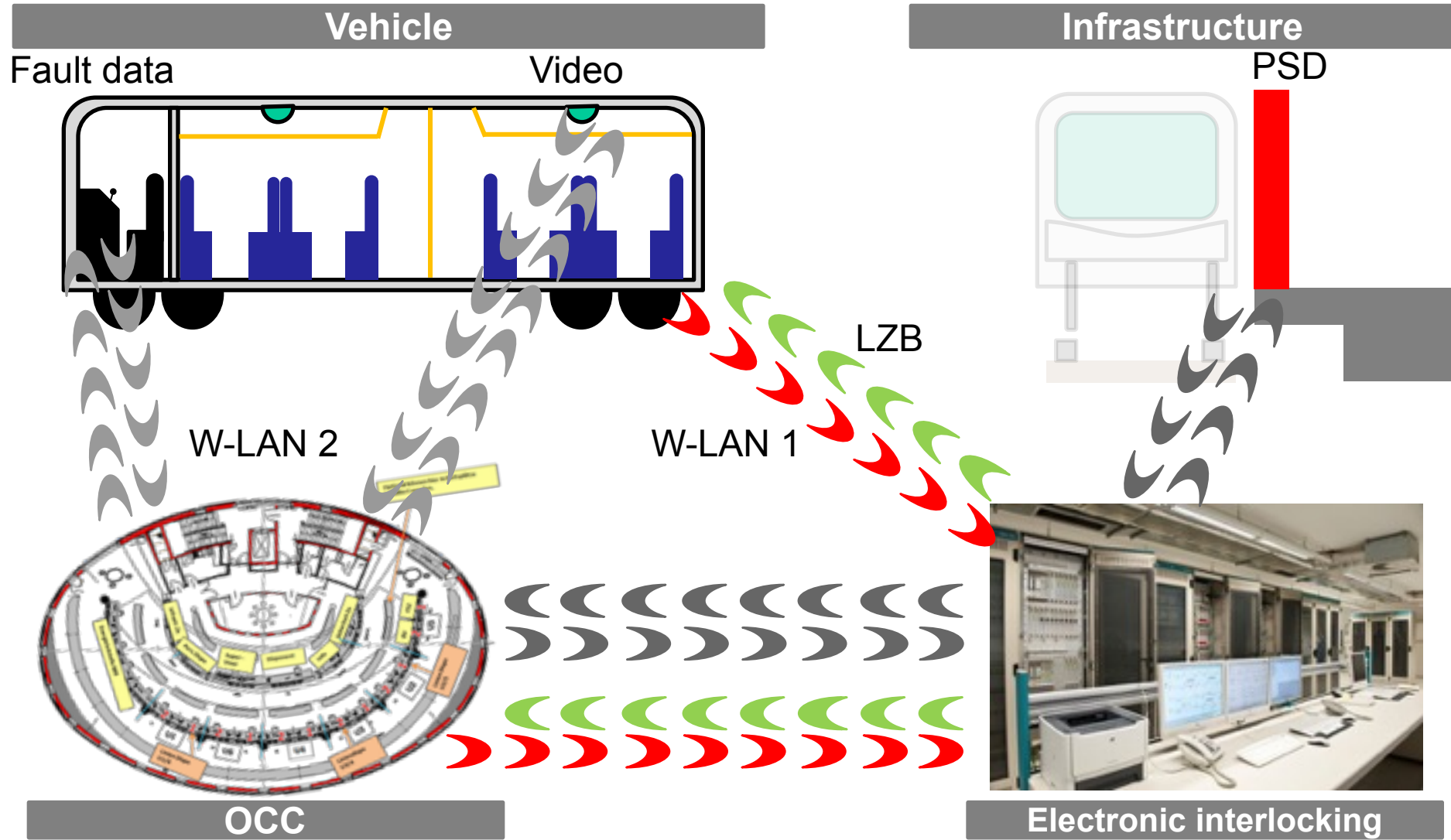
graphic based on: [www.metroautomation.org](http://www.metroautomation.org)



# II. Technical Details | Train Control Today (STO)



# II. Technical Details | Train Control Tomorrow (UTO)



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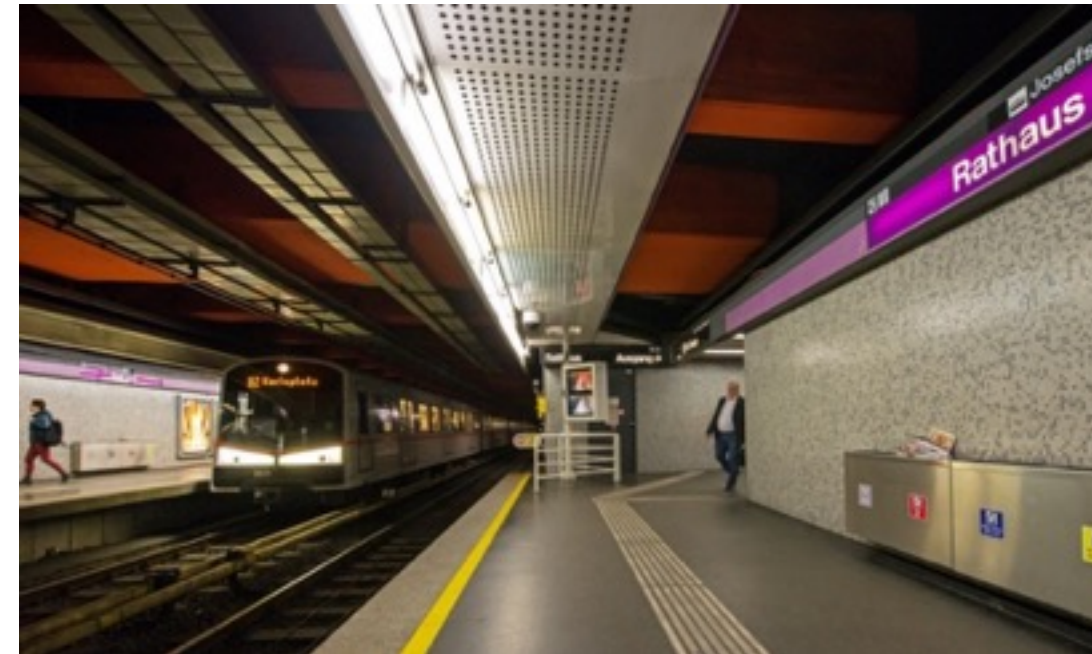
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## ➤ Challenges & Opportunities

# III. Challenges & Opportunities

- compatibility required
  - dual-equipped rolling stock
  - shunting/transfer to workshop
- upgrade during regular operation
- limited space in existing tunnel system
  - former tram-tunnels
  - narrow gauge
  - non-standard design
- reliability and stability
  - completely new system
  - no experience with CBTC yet





# III. Challenges & Opportunities

- UTO aims to...
  - ✓ create a more satisfying job profile
  - ✓ improve flexibility
    - turnback strategy in terminal stations
    - during and after interruptions
    - meeting the demand
- Why was U5-line chosen for being the first UTO line?
  - ✓ reconstructed & newly build sections
  - ✓ gaining experience
  - ✓ new line – new system



# Summary



## ✓ Project Overview

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## ✓ Technical Details

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## ✓ Challenges & Opportunities

# Thanks for listening!



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