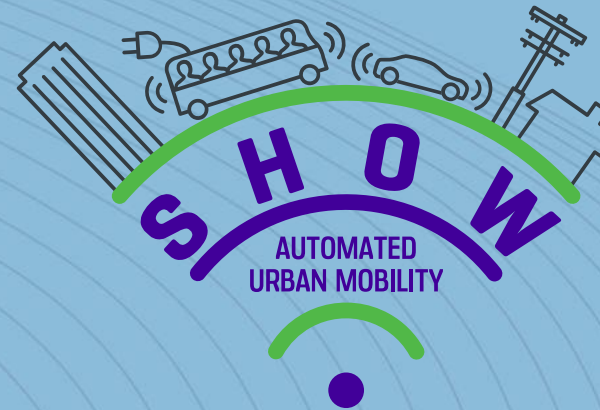


# POLIS

CITIES AND REGIONS FOR TRANSPORT INNOVATION

ANNUAL  
CONFERENCE

2022



30 November  
1 December, 2022  
Brussels, Belgium



#POLIS2022

# SHOW project in Madrid: Automated public transport

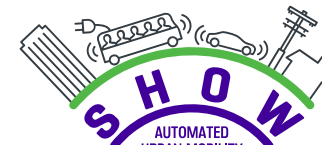
Session 4B. **Are cities ready for vehicle automation?**

*Sergio Fernández Balaguer*

*Head of International department, EMT Madrid*

# Empresa Municipal de Transportes de Madrid

Values



Innovation

Sustainability

Accesibility

Vocation of service



# EMT Strategic Plan 2021-2025

Innovating in all the strategic axis



PLAN  
ESTRATÉGICO  
EMT MADRID  
2021-2025



MADRID



## Operations



### Piloting on-demand and autonomous bus

Prospection and development of pilots to foster innovation and the international positioning of the company, offering new services to users



### Development of the Bus 2030 – Concept bus

Design of the new bus model, with technological improvements deployed on board to improve the quality, efficiency and safety of the service.

# SHOW project



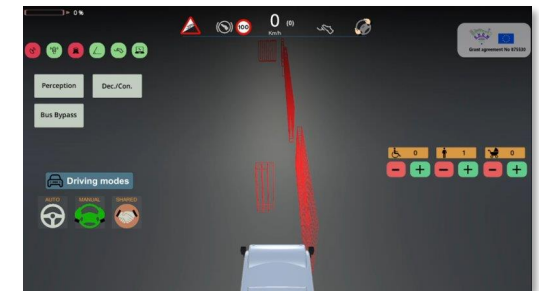
**Demo Sites**



**70**  
**Automated Vehicles**  
Robotaxis, buses,  
and shuttles  
for persons & goods



Map showing demo sites across Europe: Tampere, Gothenburg, Linköping, Copenhagen, Eindhoven, Monheim, Rouen, Karlsruhe, Brno, Salzburg, Graz, Carinthia, Turin, Madrid, and Trikala.



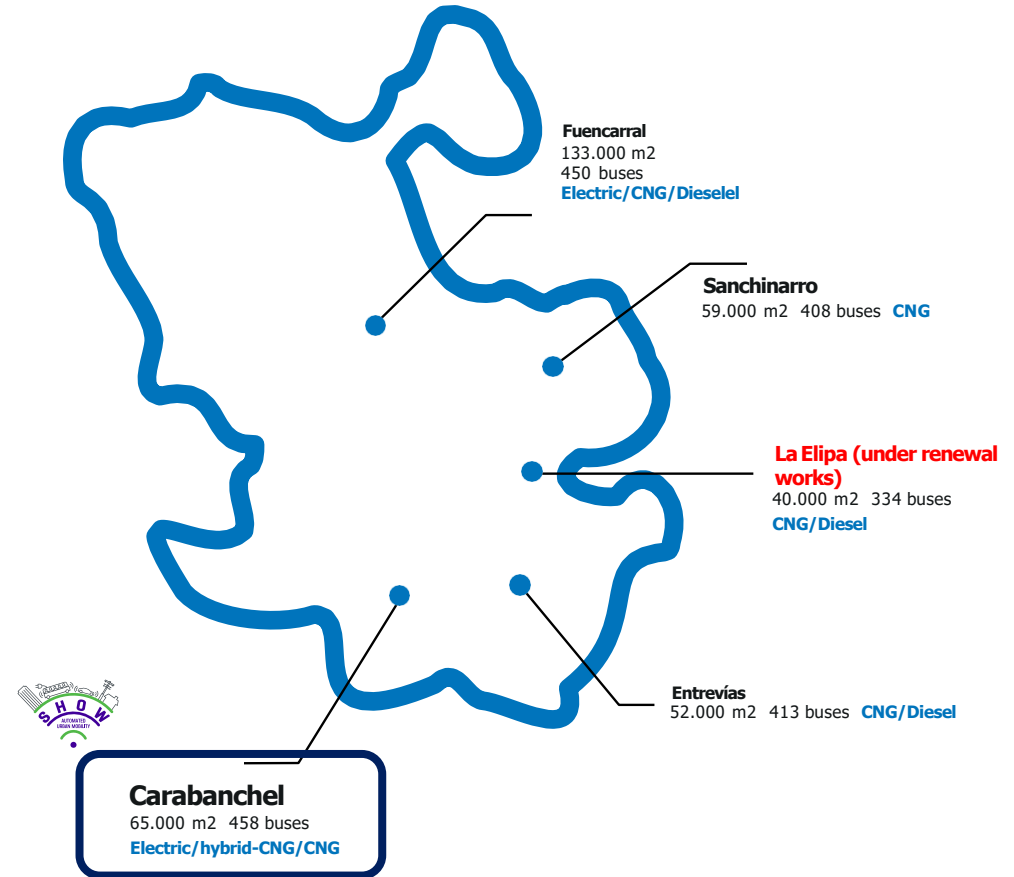
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875530.



# BUS DEPOTS



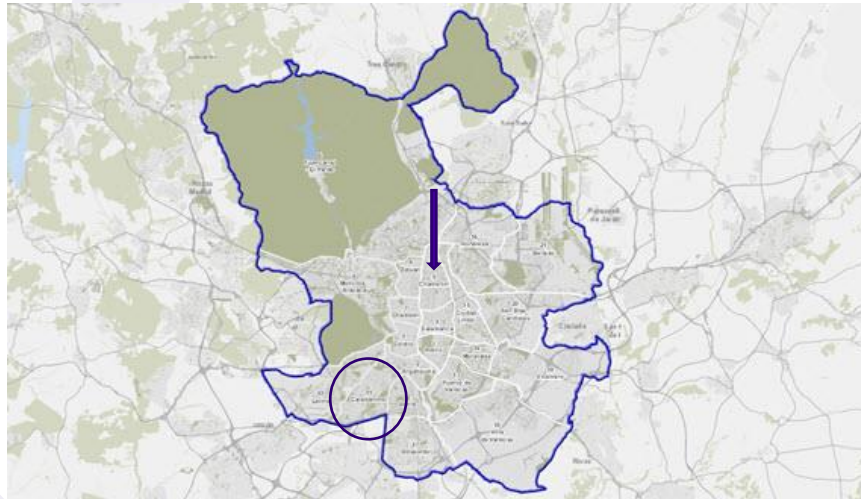
## 5 Operational Centers distributed around Madrid City



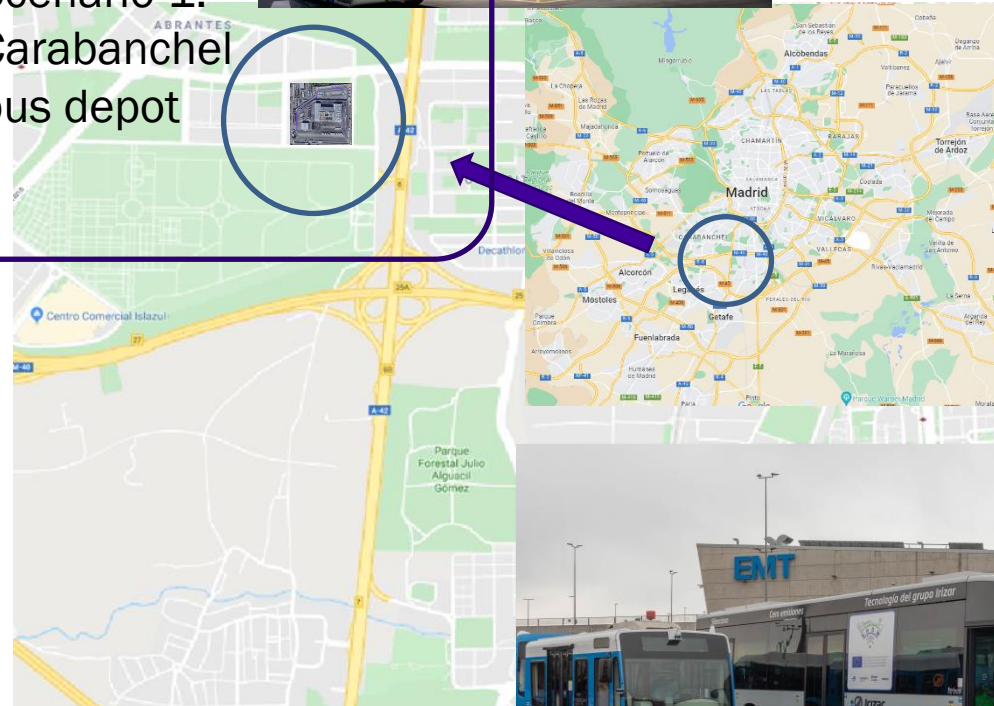
# Scenario 1: Carabanchel bus depot



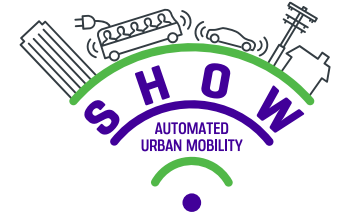
- South of the city



Scenario 1:  
Carabanchel  
bus depot



# Range of UCs at Carabanchel scenario

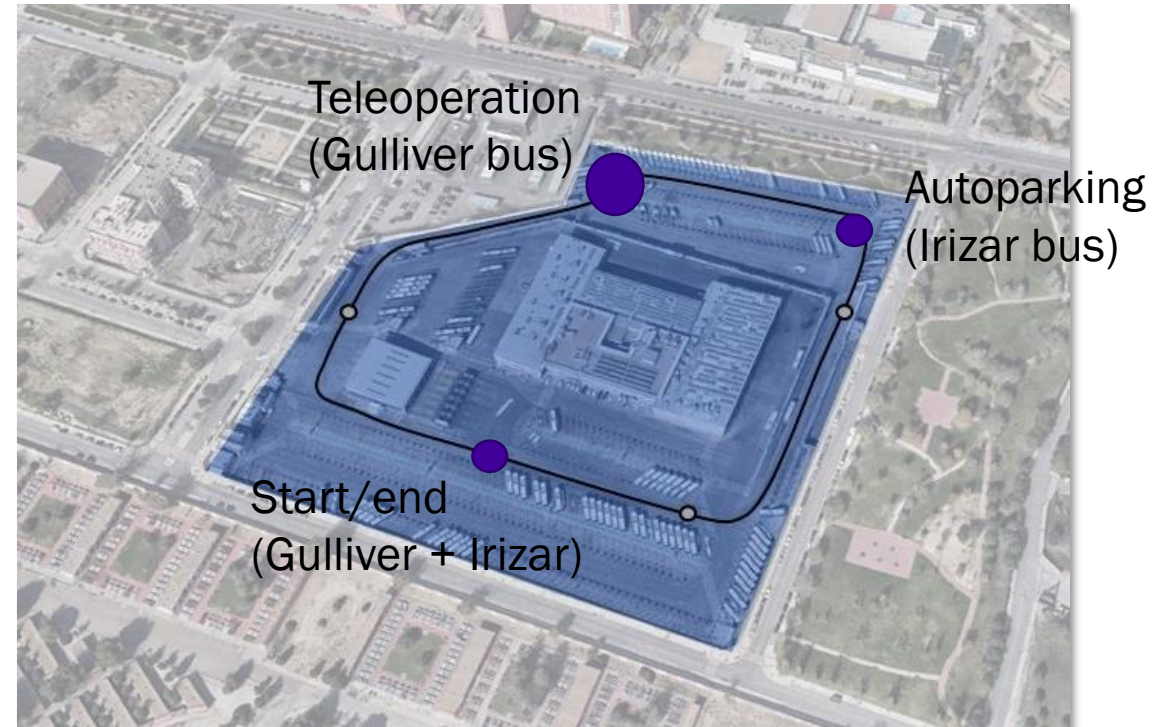
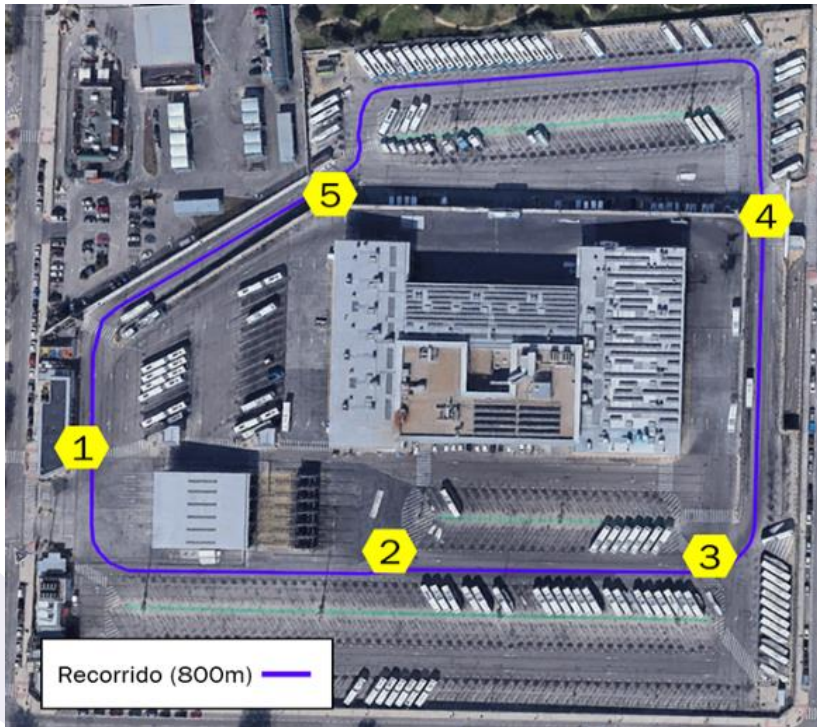


- UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions
- UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions
- UC1.3: Interfacing non automated vehicles and travellers (including VRUs)
- UC1.6: Mixed traffic flows
- UC1.7: Connection to Operation Centre for tele-operation and remote supervision.
- UC1.10: Seamless autonomous transport chains of Automated PT, DRT, MaaS, LaaS
- UC3.3: Automated parking applications.
- UC3.5: Depot management of automated buses.

# Itinerary

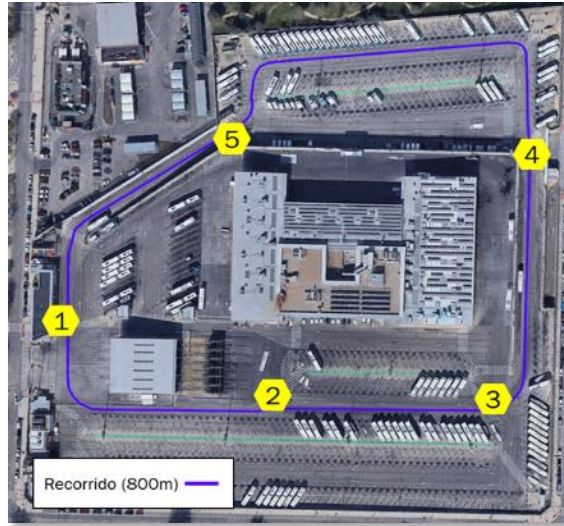


- On a daily basis, within the bus depot: 5 stops
- Two areas with specific UCs



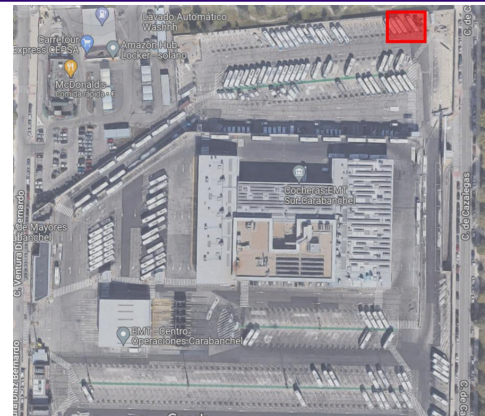
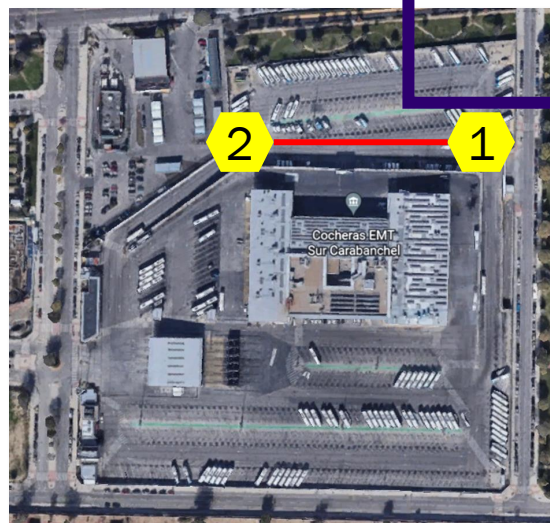


# MADRID – Carabanchel ecosystem



Autoparking

"5 STOPS"

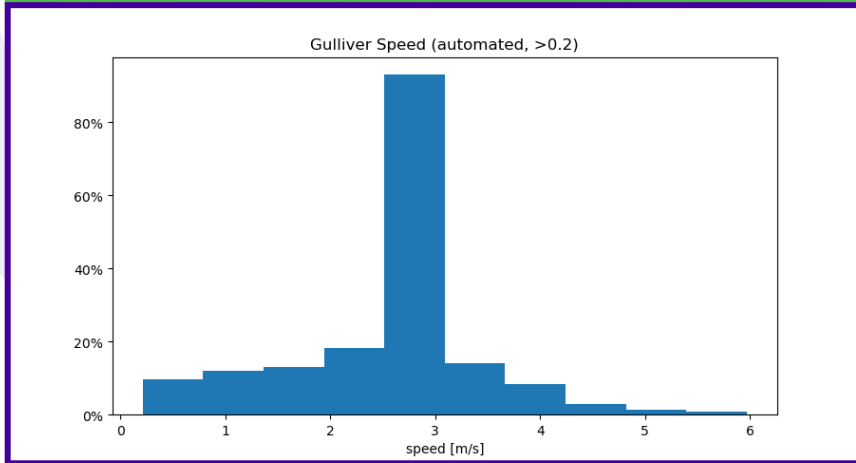
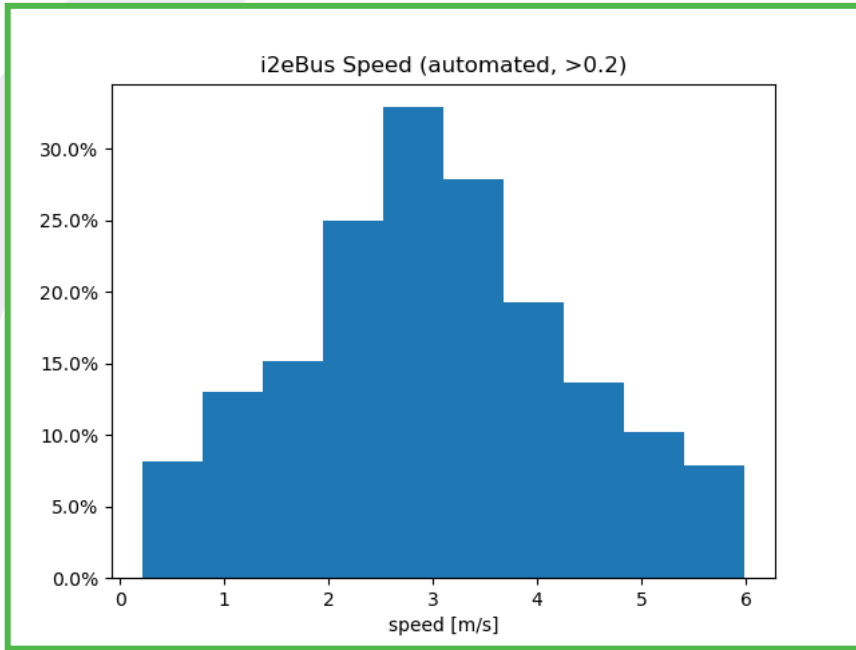
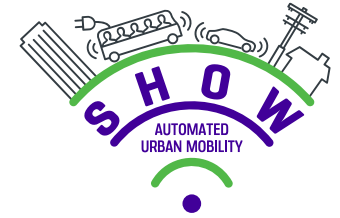


Tele-Operation

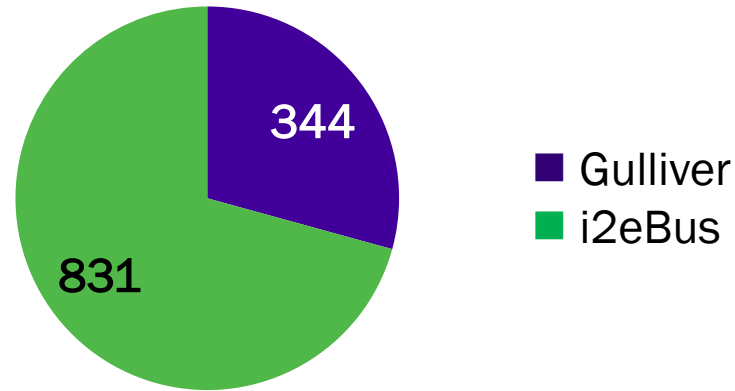
Demo Board meeting #10 - Madrid



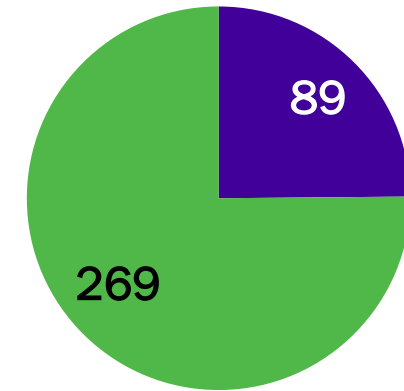
# MADRID - CARABANCHEL 5 STOPS SERVICE



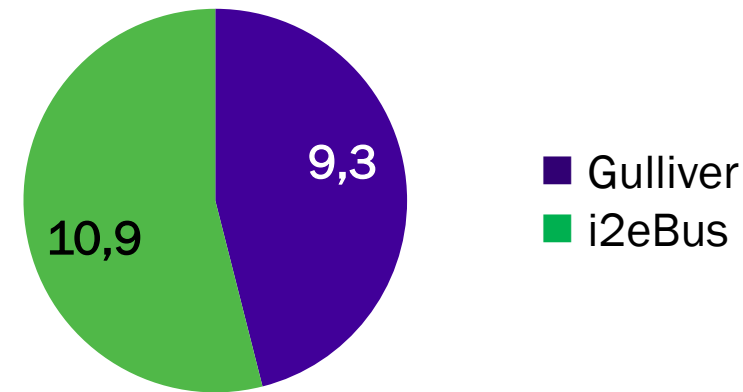
3 m/s = 10,8 kph



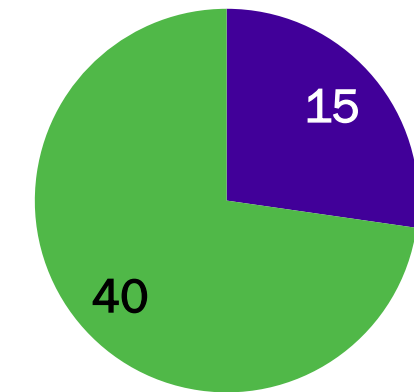
Total time on automated mode (minutes)



Total passengers

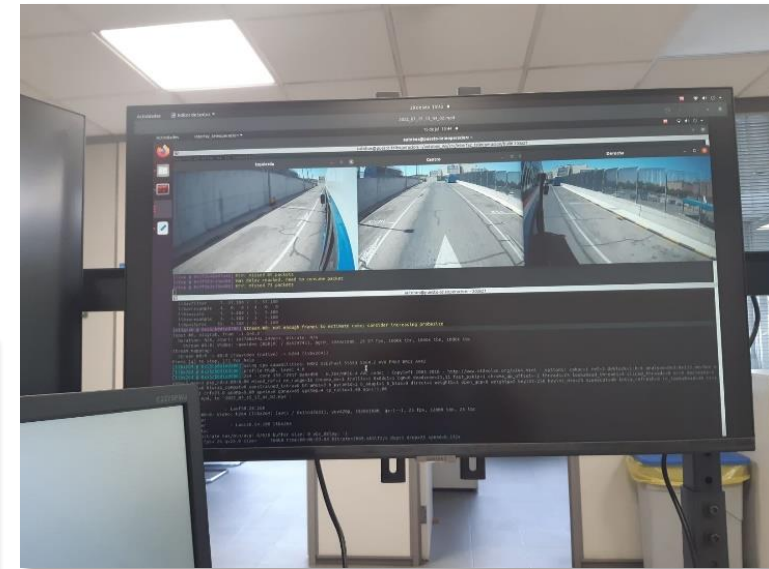
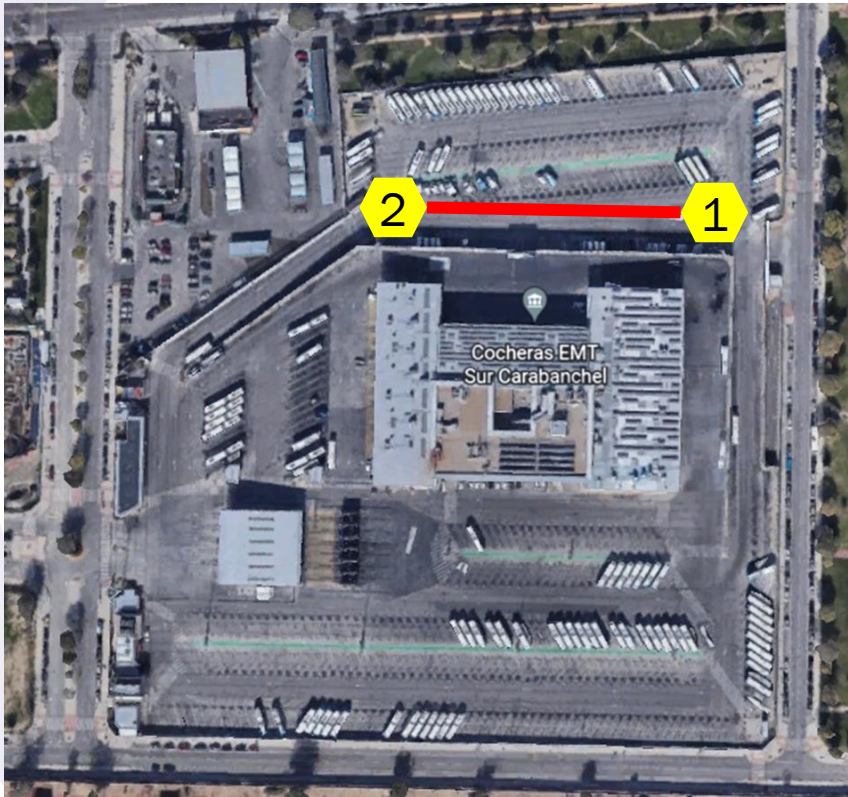


Average Speed (kph)

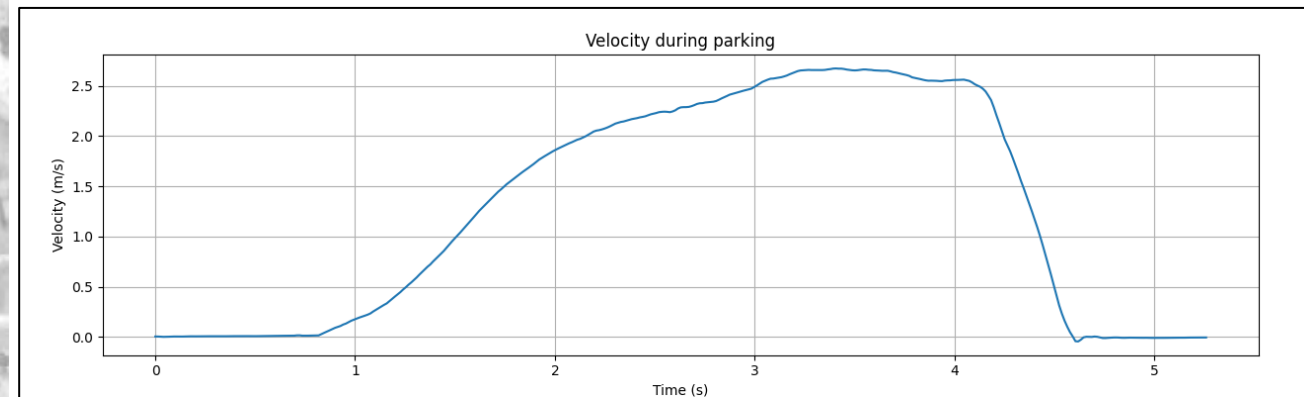
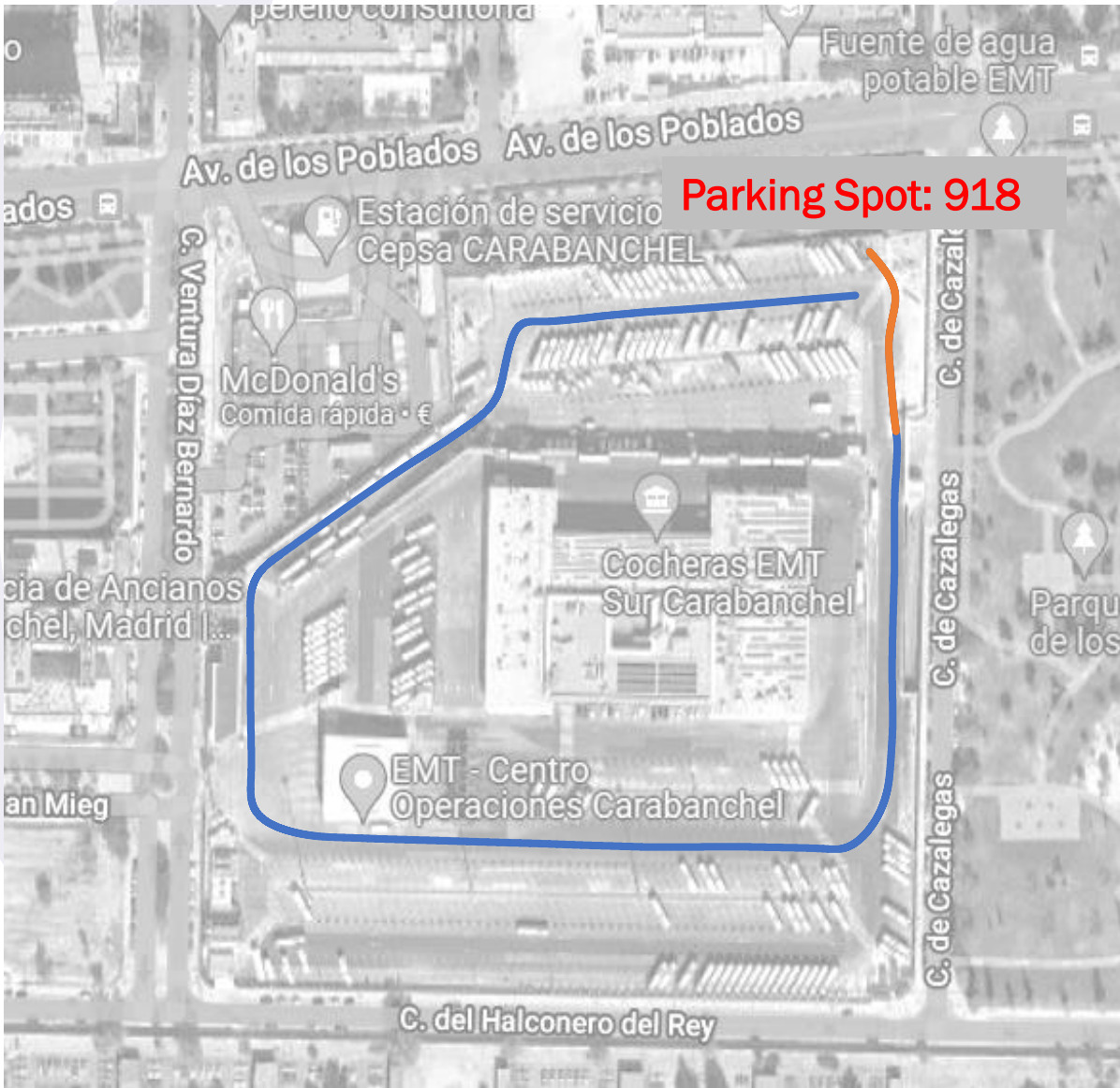
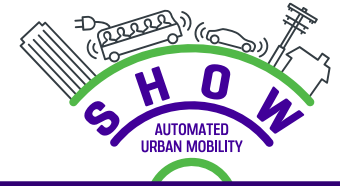


Total operation days

# MADRID – CARABANCHEL REMOTE CONTROL



# MADRID - CARABANCHEL AUTOPARKING SERVICE





## Pre-Demo Service

EMT Carabanchel Depot, Madrid



indra

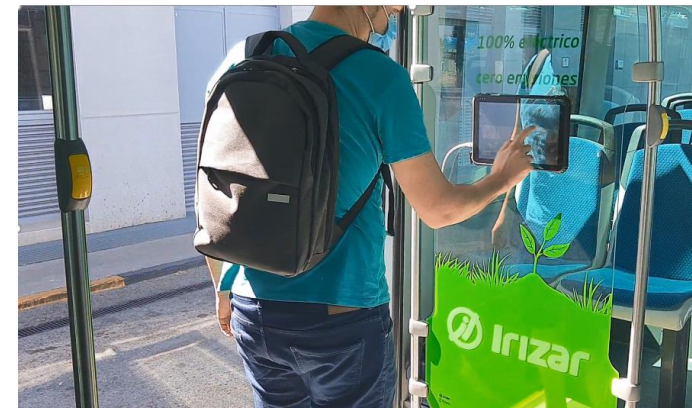
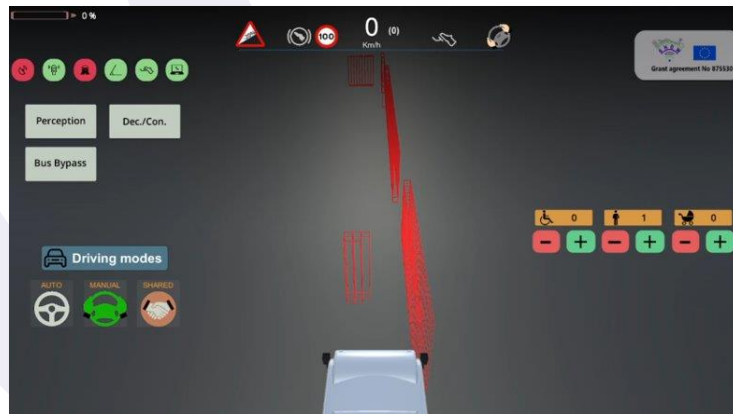
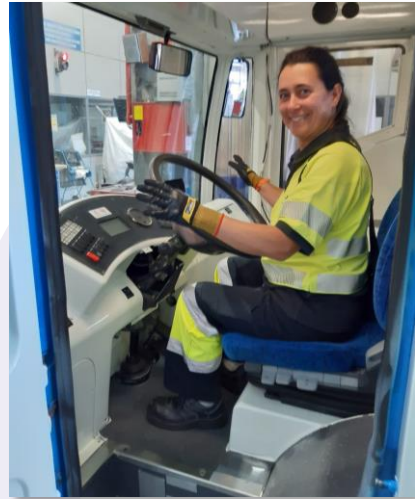


EMT MADRID

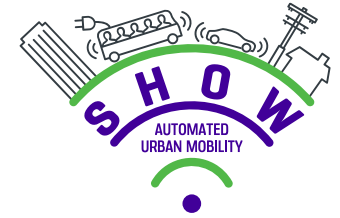
tecnal:a

MEMBER OF BASQUE RESEARCH  
& TECHNOLOGY ALLIANCE

# Carabanchel – Drivers and passengers



# Data reporting: dashboard



SHOW Dashboard

Global Dashboard | Geofence Management | Site Management

Leonardo Gonzalez

Home > Dashboard > Madrid

### Madrid Dashboard

View KPIs | Madrid | Madrid Fleet

Active Vehicles (5) | Alerts (0)

**Gulliver**  
Tecnobus | Disconnected

Gulliver-2

**i2eBus**  
IRIZAR | Connected

i2eBus | NA

Basic Details

Sensor Details

Latitude	40.3729
Longitude	-3.7245
Altitude	0
Speed	2.82 m/s
Mileage	0 KMPL
Seats Occupied	0
Door	NA
Wipers	NA
Ramp	NA
Push Chair Passengers	0
Wheel Chair Passengers	0
Battery	NA
Internal Temperature	NA
External Temperature	NA

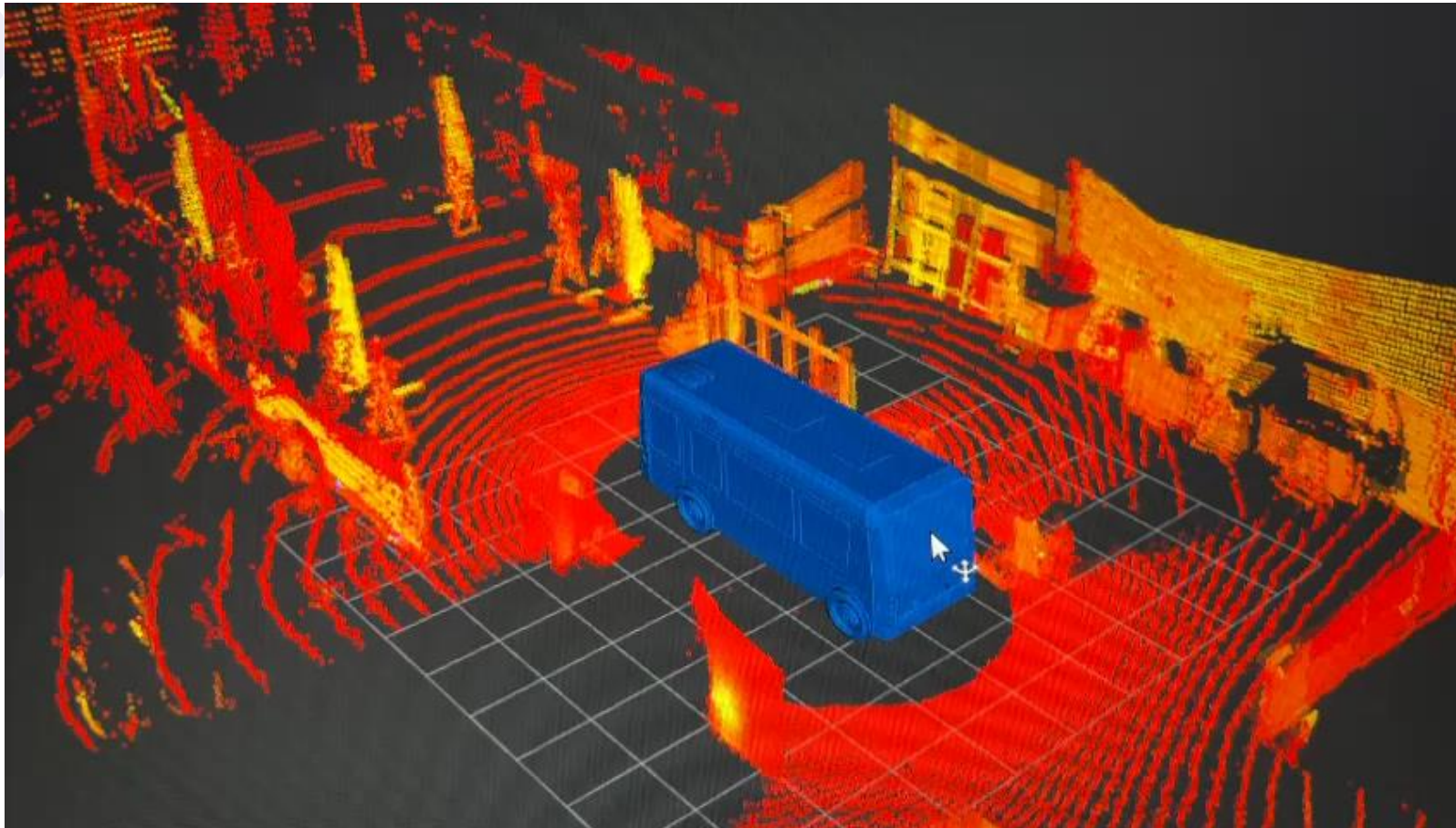
0:00:21 | 0:01:04

# Long and complex process





# Integration, perception...





## Theoretical and practical training

# Before leaving...help us with your feedback!



- Pre-acceptance survey



- <https://www.netigate.se/a/s.aspx?s=966318X291934363X65819>



# Thank you for your attention!

<https://show-project.eu>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875530

