

# 3rd PanEuropean Workshop Madrid Mega Site

@ EMT, INDRA, IRIZAR and TECNALIA – October 19<sup>th</sup>, 2022



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



Thank you  
for coming  
to Madrid!

Anyone would like to attend FIAA  
(International Fair of Bus and Coach) taking  
place these days in Madrid?



**fiaa**  **18-21 OCT 2022**

<https://www.ifema.es/en/fiaa>

- Ask us for a free pass!!

Meeting, Date, Place





EMT MADRID



Created in 1947.

Company 100% owned by Madrid City Council.

Service 24/7 all year round.

Operates and manages the whole network of public urban buses in Madrid city.

EMT also provides other public mobility services in the city of Madrid:

- Since 2014, managing parking facilities and tows.
- Since September 2016, the public e-bike sharing system BiciMAD.
- Since January 2018, the cable car system

But also managing the segregated bus lanes, buses and bus canopies/shelters advertising exploitation, and Consultancy



**9.816** employees



**219** bus lines, 3,861 km network,  
10,574 bus stops



**2.100** buses (95,76% clean fleet)  
5 bus depots

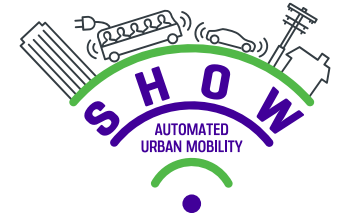


**439** million passengers in 2019  
1,600,000 passengers/labor day



**241,5** million passengers in 2020  
1,000,000 passengers/labor day

## MAIN FIGURES



2022 Budget : **744** M€



80 cranes in 7 depots  
**77,899** operations in 2019



**3,418** bikes (100% electric)  
72,435 subscribers, 3.8 M trips/year  
258 bike stations



**12,451** parking lots in  
28 parking facilities



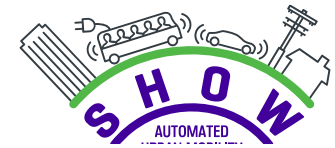
**80** cable car cabins  
Max. capacity: 1,200 passengers/hour





# Empresa Municipal de Transportes de Madrid

Values



Innovation

Sustainability

Accessibility

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



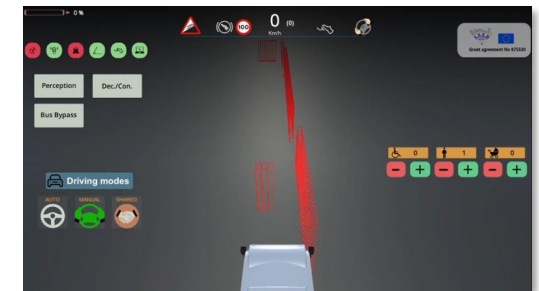
**Demo Sites**



**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.



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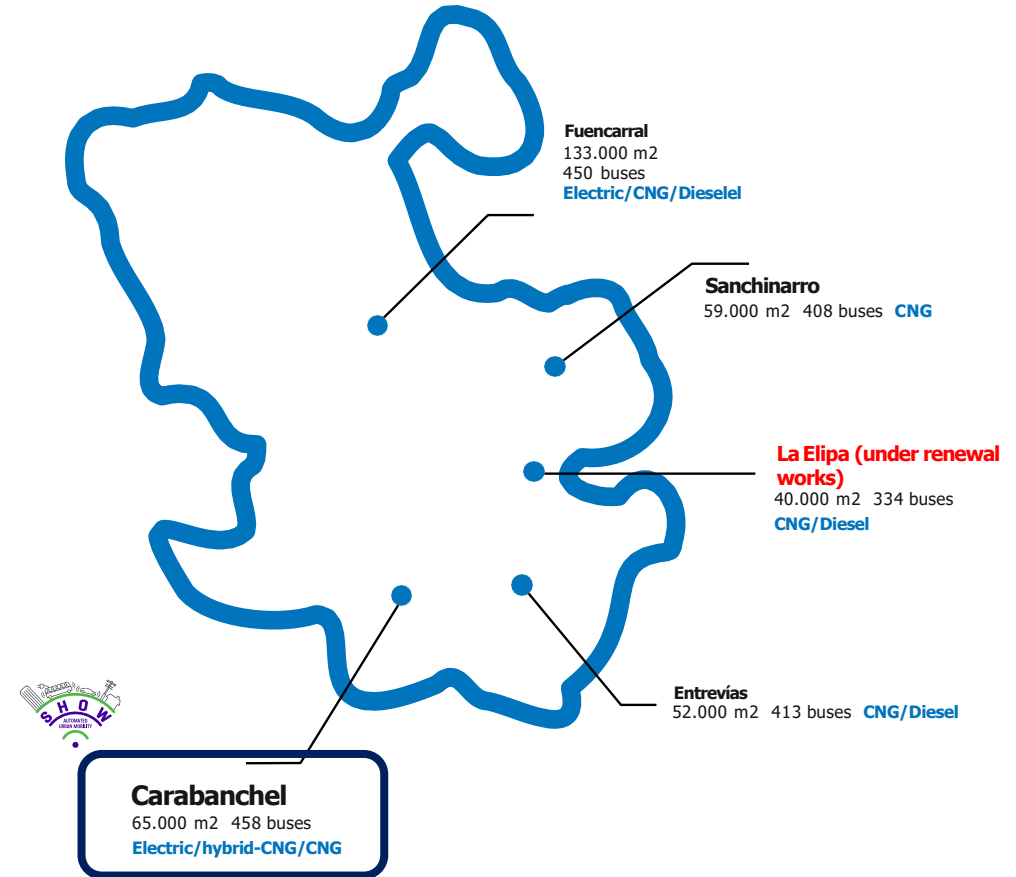




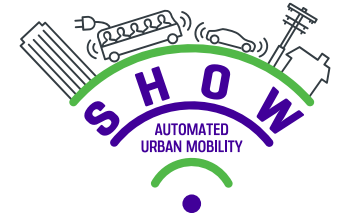
# BUS DEPOTS



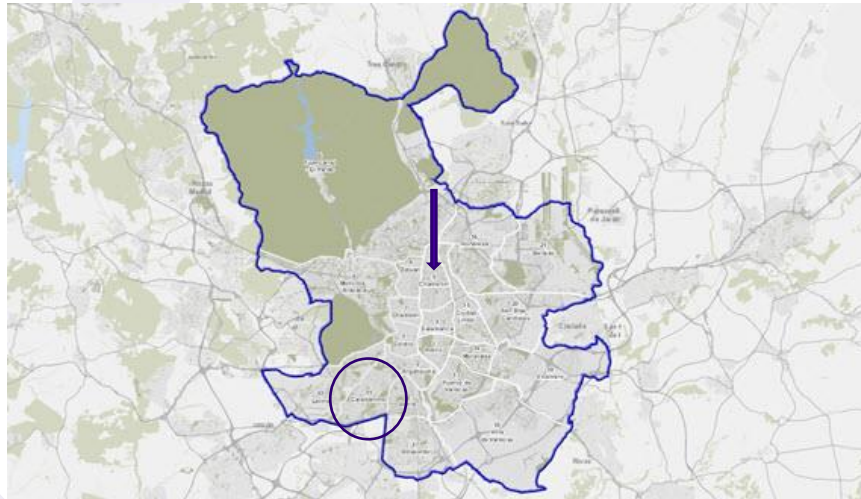
## 5 Operational Centers distributed around Madrid City



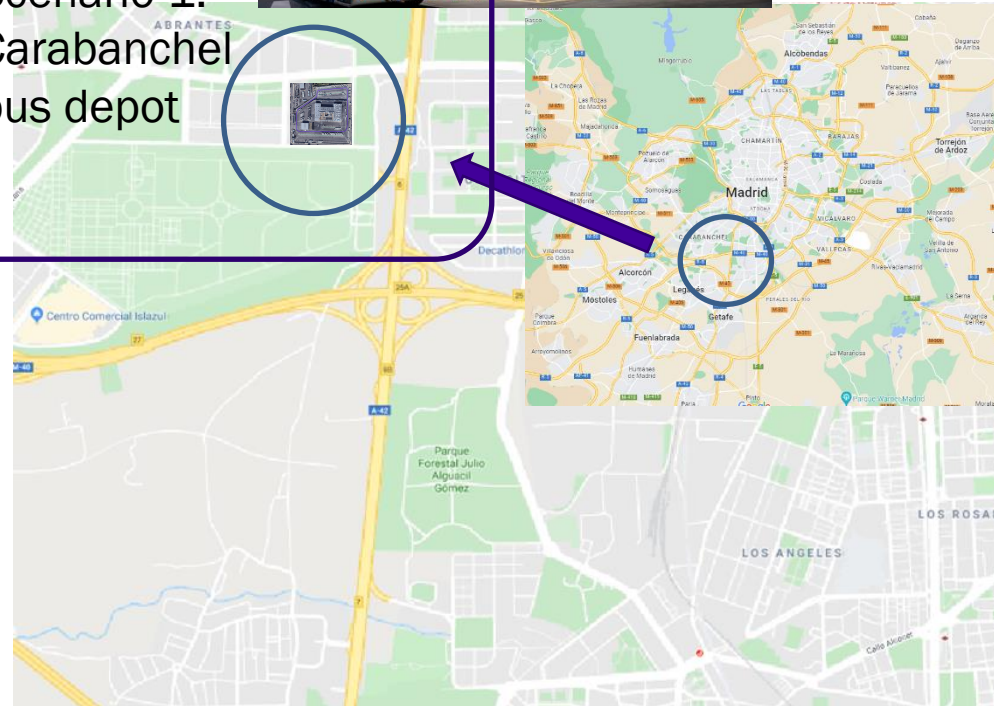
# Site visit: Carabanchel bus depot



- South of the city



Scenario 1:  
Carabanchel  
bus depot





# Site visit to Carabanchel bus depot



- Ride on the autonomous buses
- Visit of the bus depot:
  - Facilities: maintenance, workshops, etc.
  - New charging infrastructure for e-buses: inverted pantographs area





# Panto area (how it will look like)





# What are we going to see?

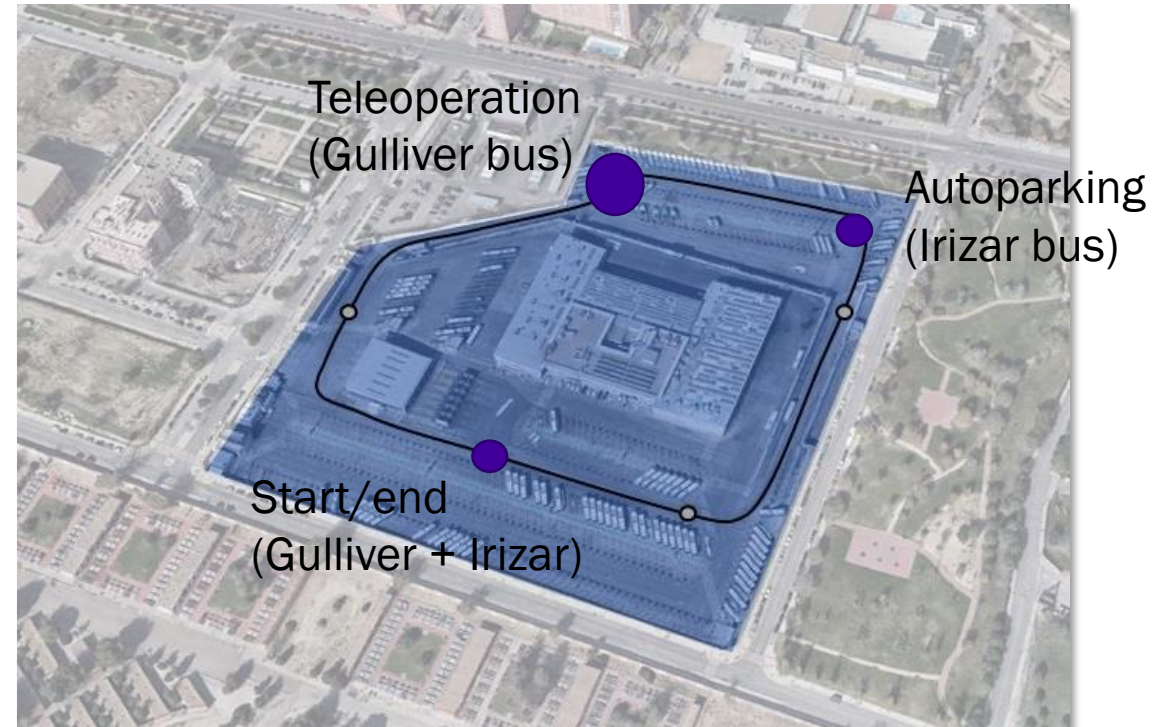
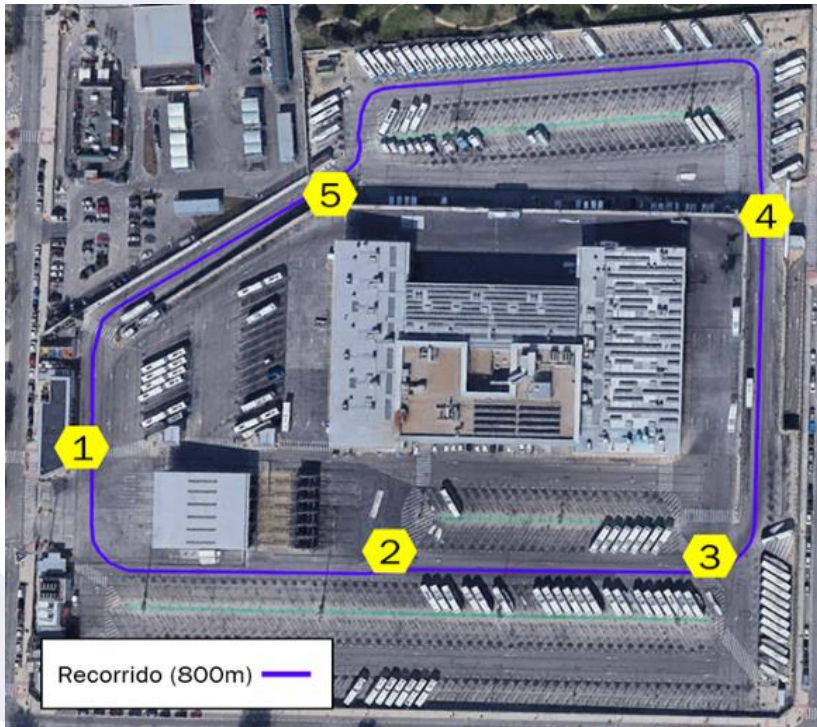


- Range of UCs at Carabanchel scenario:
  - UC1.1: Automated passengers/cargo mobility in Cities under normal traffic & environmental conditions
  - UC1.2: Automated passengers/cargo mobility in Cities under complex traffic & environmental conditions
  - UC1.3: Interfacing non automated vehicles and 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

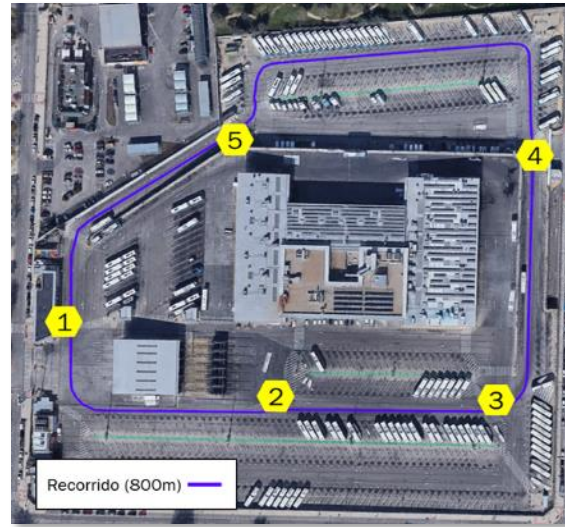


- On a daily basis, within the bus depot: 5 stops
- For the site visit: simplified to 2



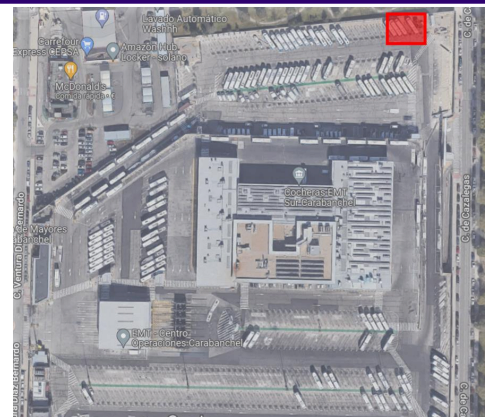
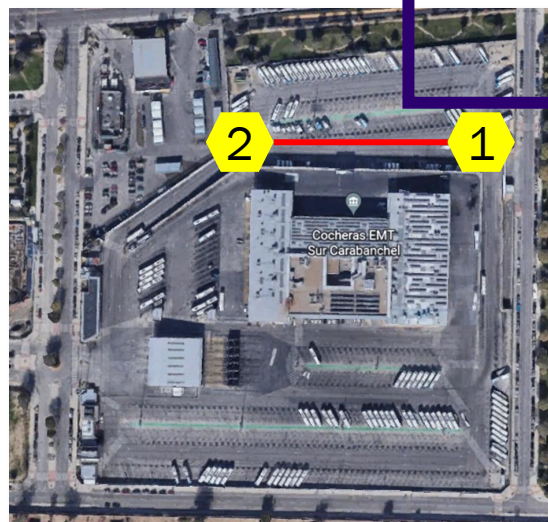


# MADRID – Carabanchel ecosystem



Autoparking

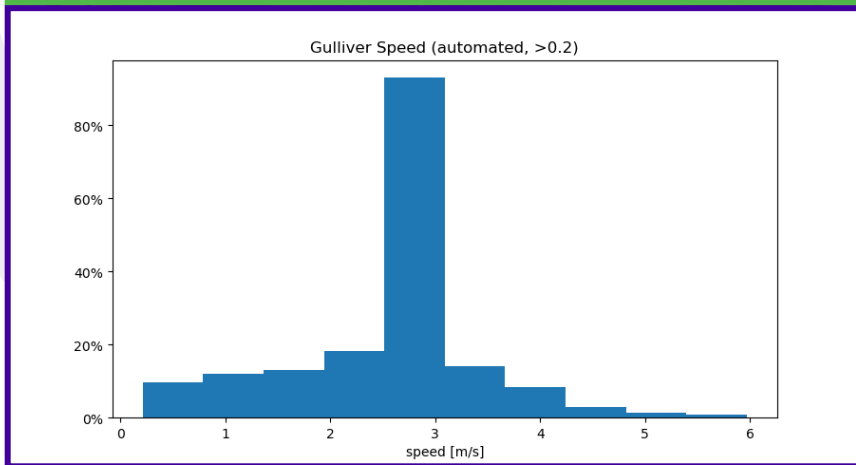
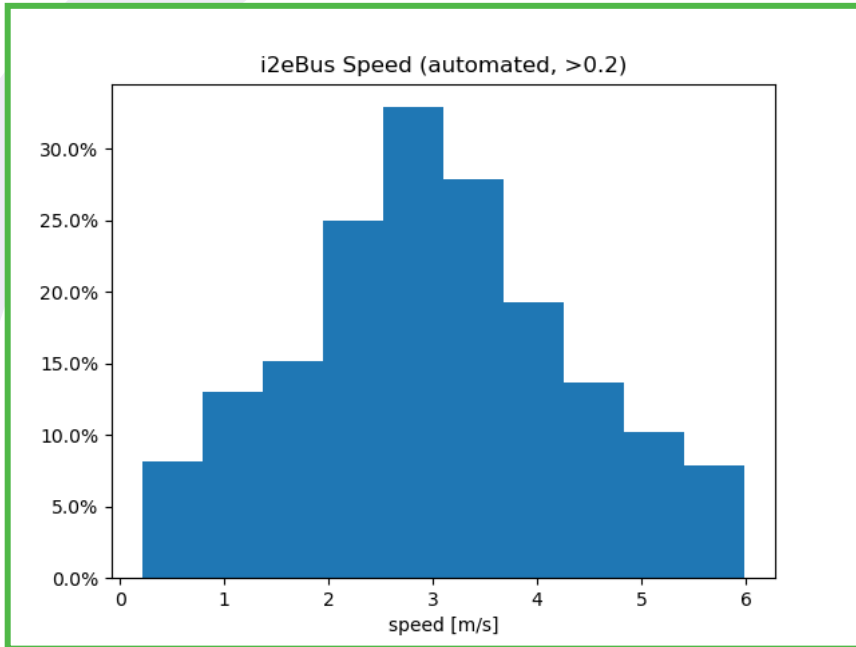
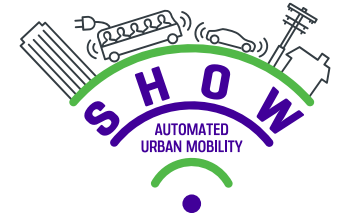
"5 STOPS"



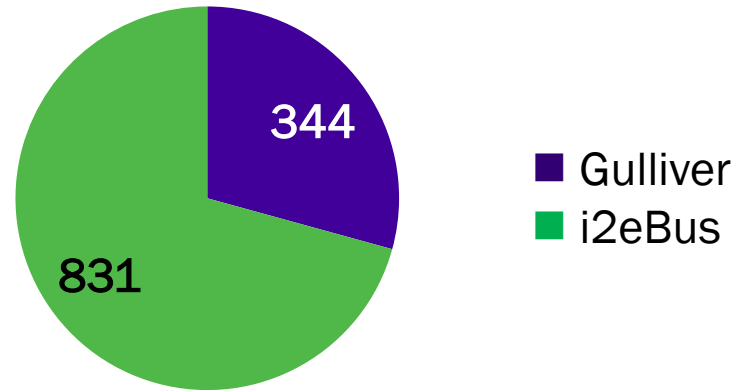
Tele-Operation

Demo Board meeting #10 - Madrid

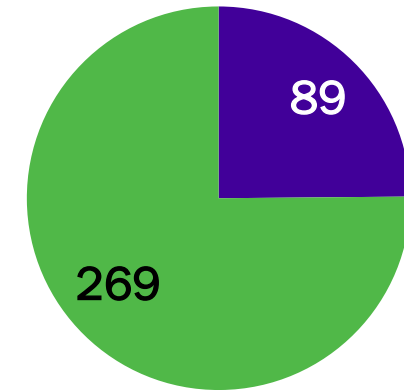
# MADRID - CARABANCHEL 5 STOPS SERVICE



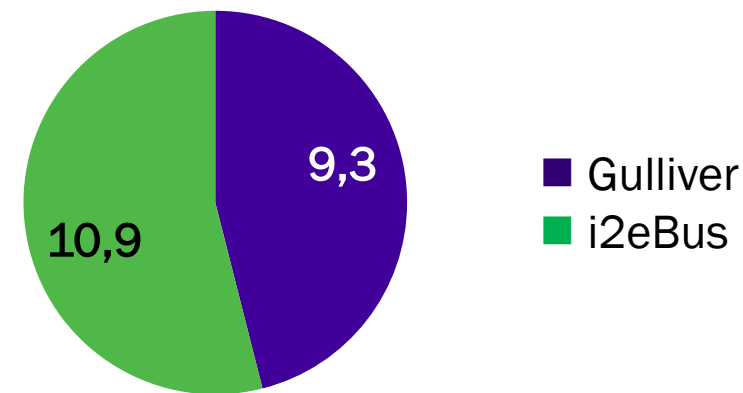
3 m/s = 10,8 kph



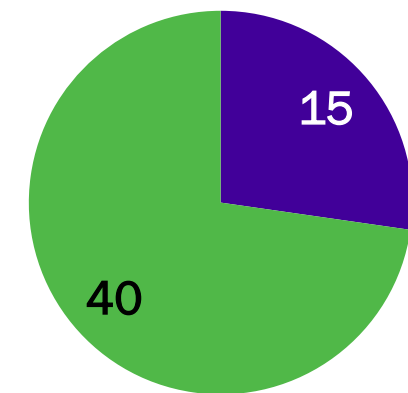
Total time on automated mode (minutes)



Total passengers



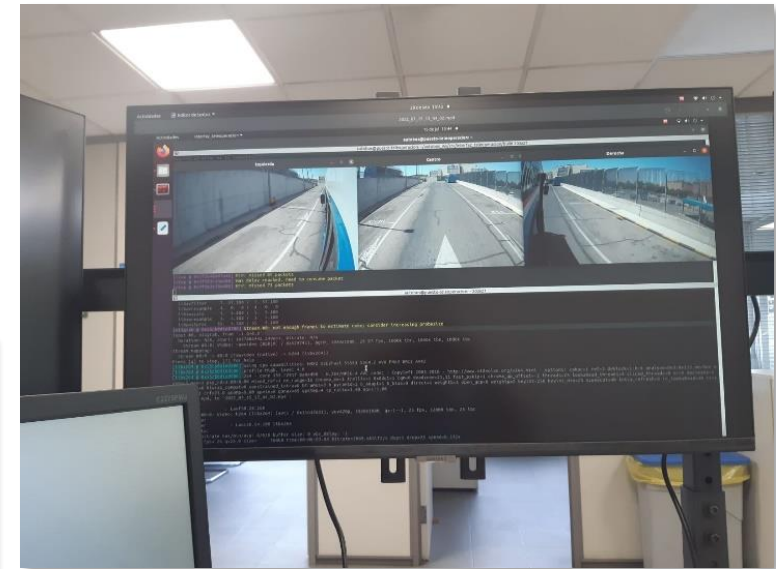
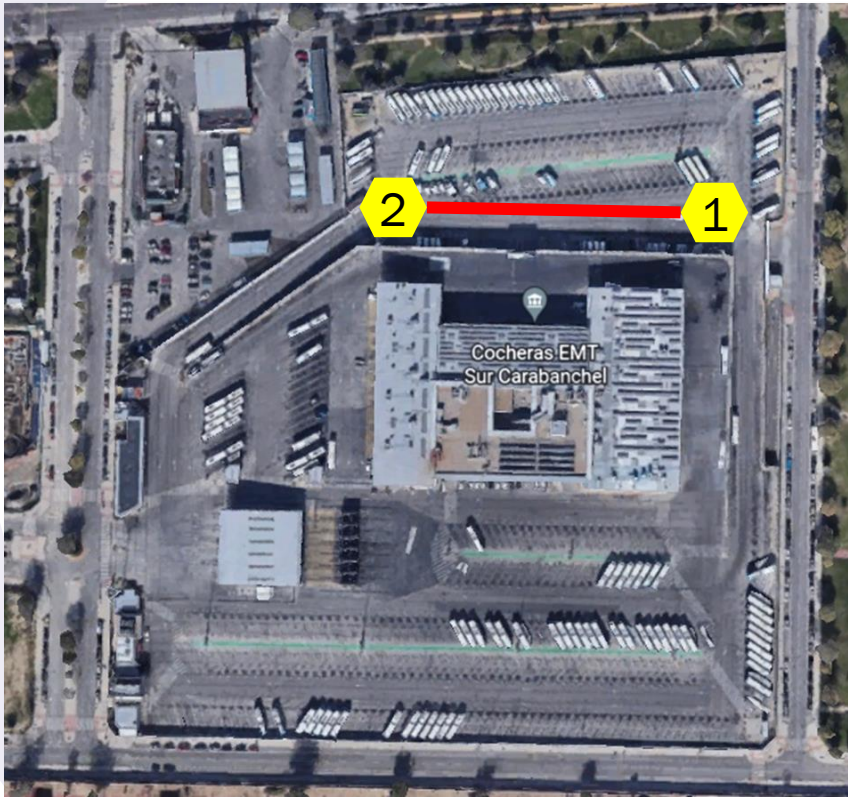
Average Speed (kph)



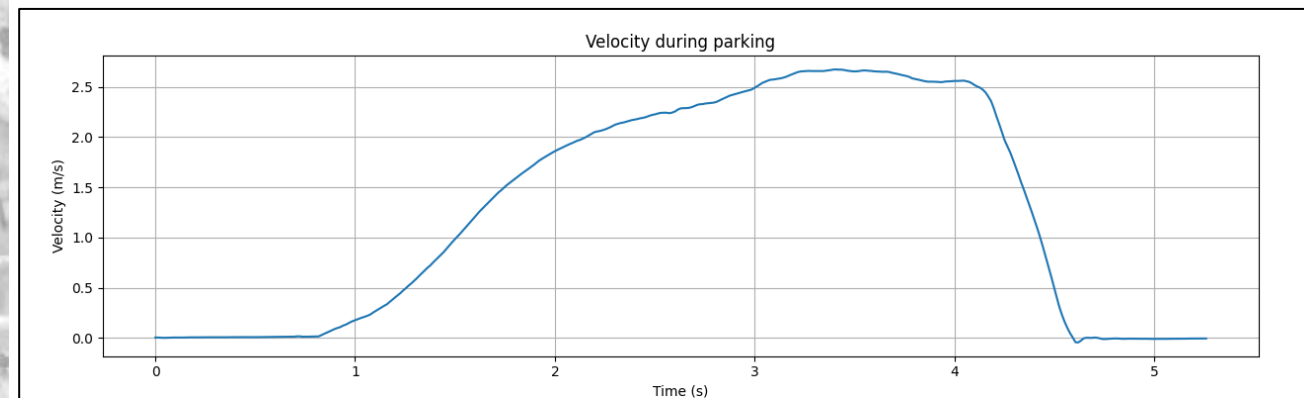
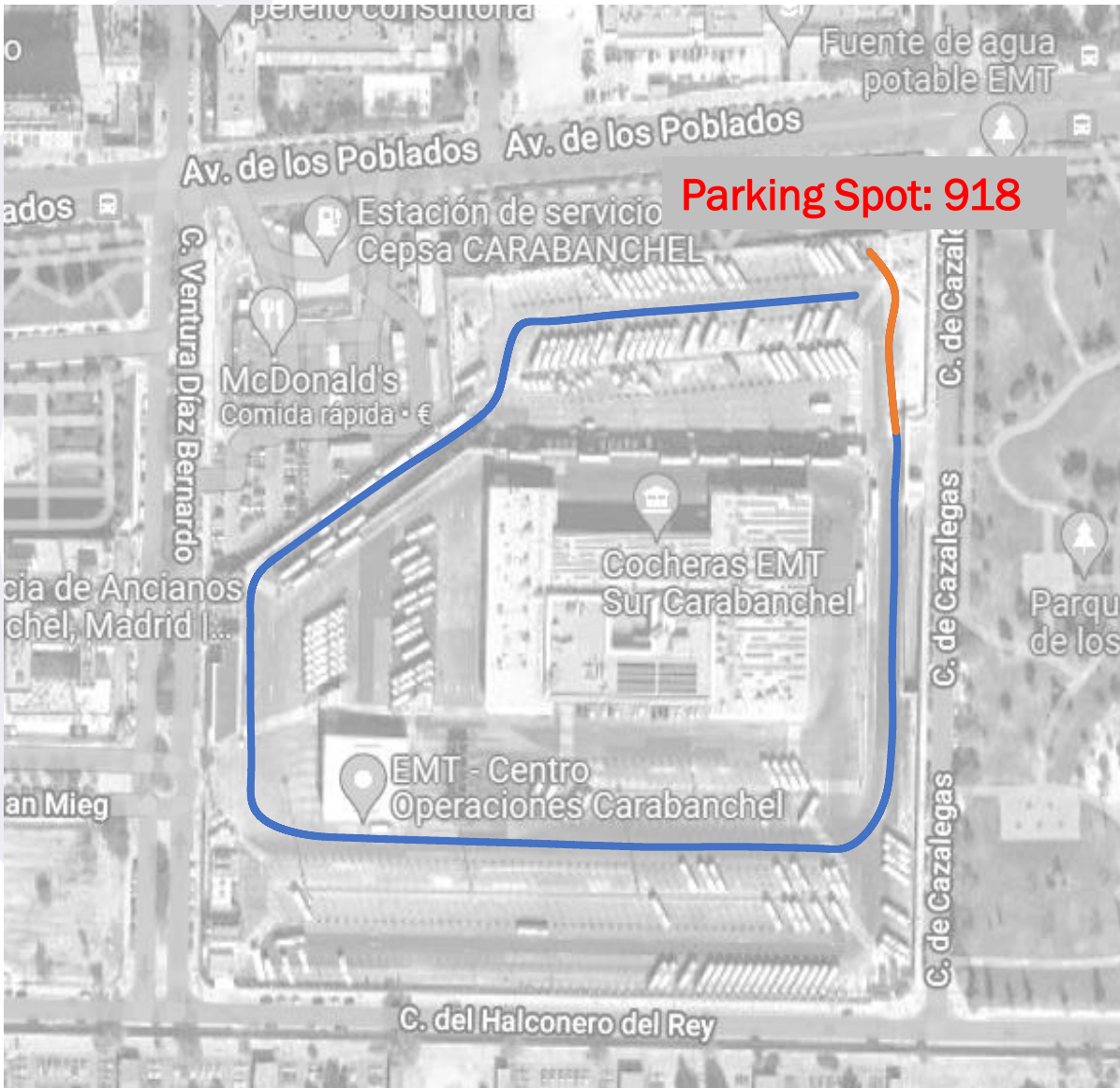
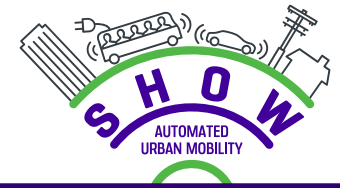
Total operation days



# MADRID – CARABANCHEL REMOTE CONTROL



# MADRID - CARABANCHEL AUTOPARKING SERVICE







## Pre-Demo Service

EMT Carabanchel Depot, Madrid



indra

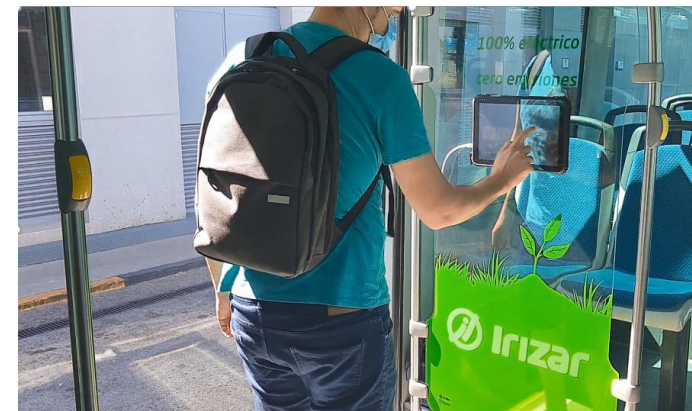
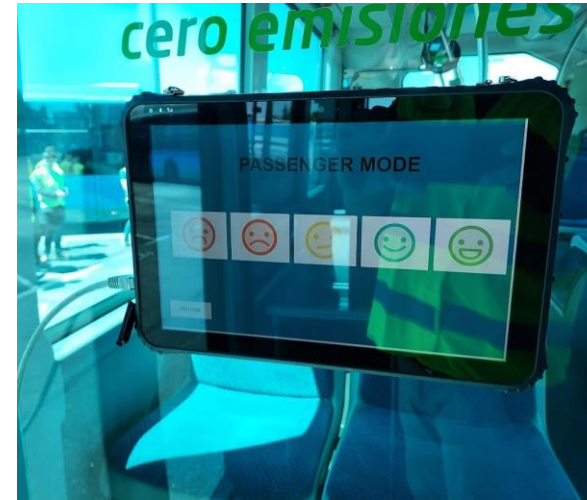
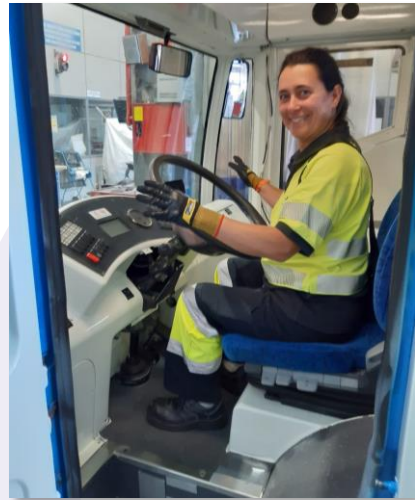
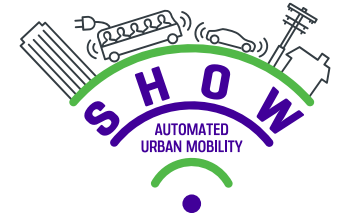


EMT MADRID

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

Map labels: Avenida de los Poblados, Establos, le los los, an Mieg, Calle Ventura Diaz Bernarbo, Calle de José Unoste y Valada, Calle de Ildefonso Gonzalez Valencia, Parque Av. de los Poblados

0:00:21 | 0:01:04

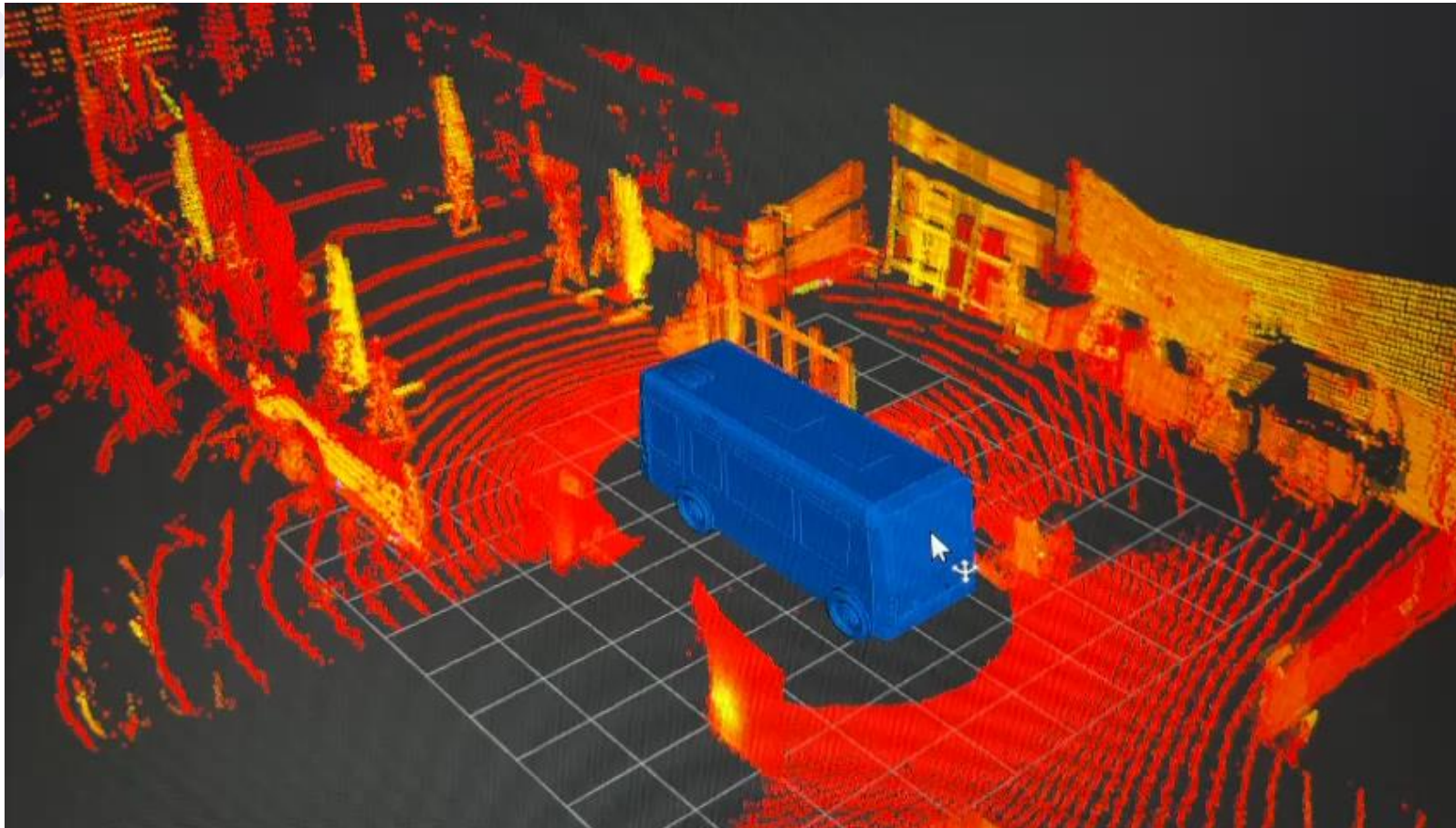


# Long and complex process





# Integration, perception...



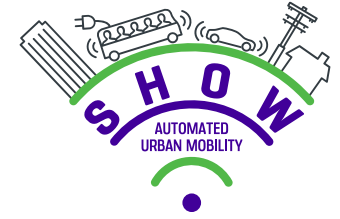




## Theoretical and practical training



# Meeting point: at 15:55!



- Main entrance of the hotel
- Once at the bus depot we will split into three groups:

Time	Group #1	Group #2	Group #3
16:00	Leaving towards Carabanchel bus depot		
16:30	Arrival to Carabanchel bus depot		
16:35	Demo buses	Bus depot visit	Pantos visit
17:00	Pantos visit	Demo buses	Bus depot visit
17:30	Bus depot visit	Pantos visit	Demo buses
18:00	End of the visit		
18:30	Return to Hotel Chamartín The One		

Group	# Passengers (Gulliver+i2eBus)
#1	30 (8+22)
#2	35 (10+25)
#3	35 (10+25)

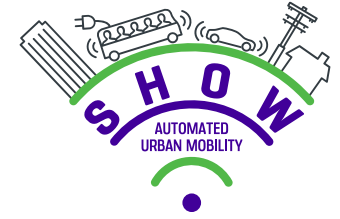
**IMPORTANT!!!!**

**NO PICTURES/VIDEOS ALLOWED DURING  
THE SITE VISIT!!!!**





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



- Pre-acceptance survey



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



**Irizar e-mobility**

**indra**

# Thank you!



@SHOW\_H2020



<http://linkedin.com/company/showh2020/>

<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