POLIS
CITIES AND REGIONS FOR TRANSPORT INNOVATION

ANNUAL CONFERENCE 2022

30 November
1 December, 2022
Brussels, Belgium

#POLIS2022

LEAD

LEAD project: Madrid LL first outcomes on the use of a Digital Twin for logistics

Session 3G. Collaborative logistics

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861598

CiVITAS 2020
Cleaner and better transport in cities

THE CIVITAS INITIATIVE IS CO-FINANCED BY THE EUROPEAN UNION

What is LEAD project?

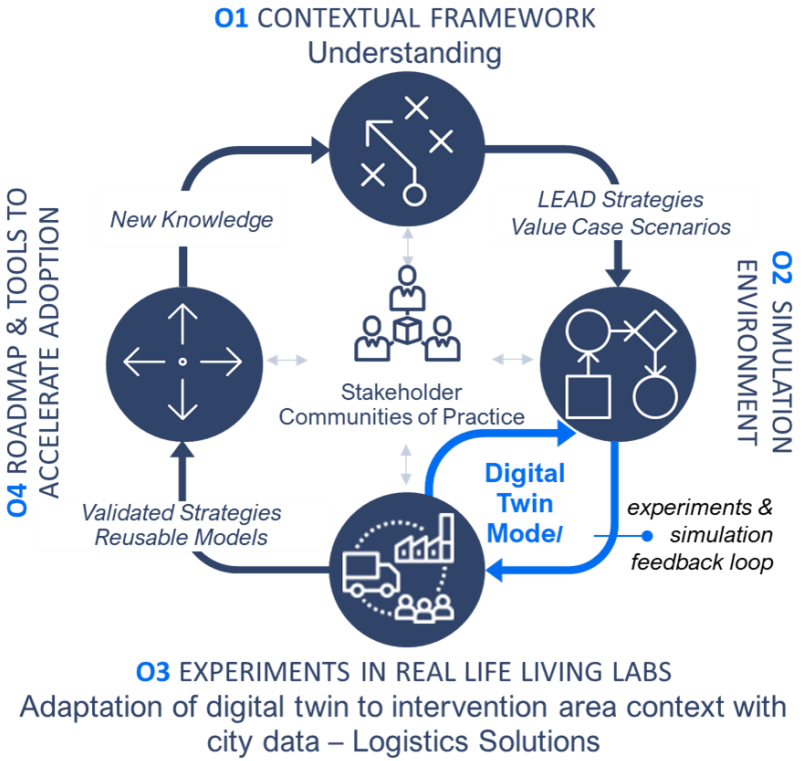
LEAD: “Low-Emission Adaptive last mile logistics supporting on demand economy through Digital Twins”

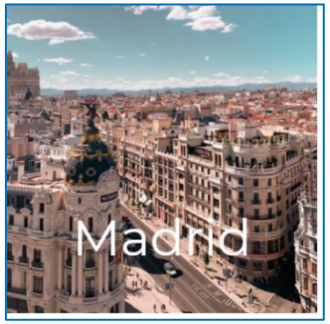
3.941.625 € (start 1/06/2020, 36 months)

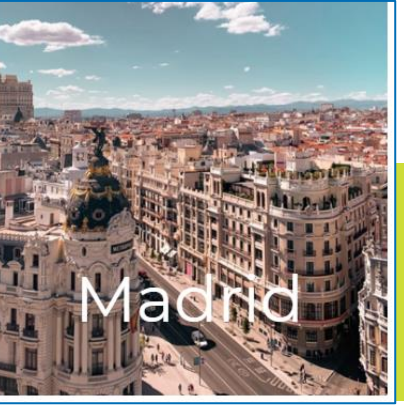
What is LEAD?

LEAD – Digital Twins creation in 6 cities (TEN-T urban nodes)

Solutions → case scenarios







Living Lab

Transforming a Parking Lot to an Urban Consolidation Centre

Status Quo

- Madrid is an important logistics hub (between the Atlantic and the Mediterranean TEN-T corridors),
- Occasional air quality and congestion challenges: urban freight distribution accounts for 11% of the urban fleet, 21% of peak hour pollution and 30% of congestion;
- Madrid LEZ and current regulations (Madrid360, new SUMP),
- Rise of e-commerce and home delivery (even more due to COVID19 and post-COVID19 challenges).

Ambition

- Demonstrate the **better efficiencies** in using a UCC connected to the TEN-T to deliver to the city center;
- Assess flows and congestion. **Route optimization engine** in many-to-many and many-to-one scenarios, combining vehicles of different fleets. Improving of environmental indicators;
- Explore **alternative (and sustainable) business models;**
- **Public-private cooperation mechanisms**, identifying new ideas for cooperation and evaluating the costs and benefits of implementation;
- The economic **efficiency and reliability** for courier companies, and henceforth for clients, of using the LEAD strategies compared to conventional freight delivery approaches;
- Explore potential **incentives**. **Data management.**

Partners:

ZLC

EMT MADRID

LastMile TEAM

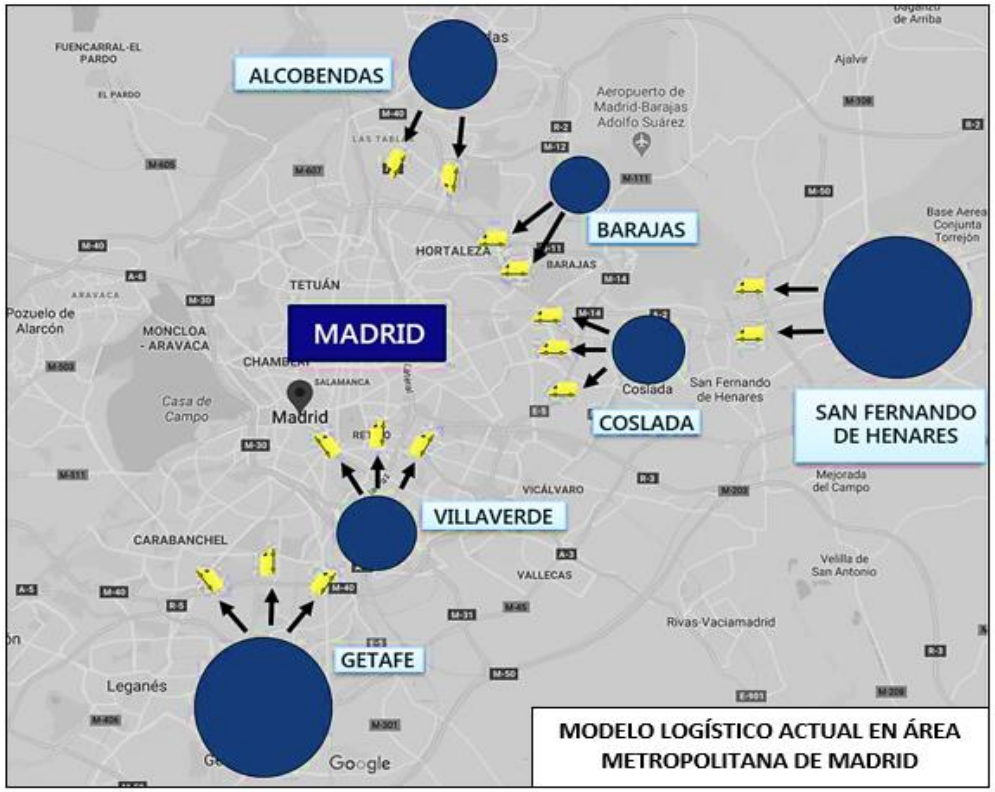
CITYlog SMART | ECOLOGICAL | FRIENDLY

POLITÉCNICA UNIVERSIDAD POLITÉCNICA DE MADRID

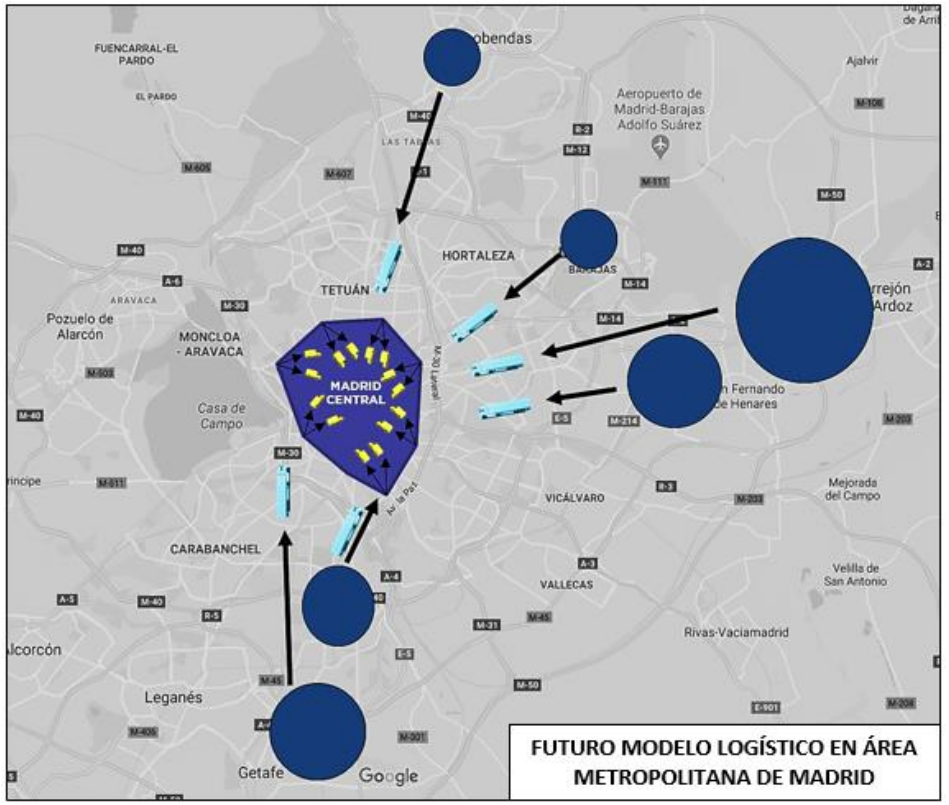
Panasonic

Living Lab Madrid

Current status (AS IS)



Desired status (TO BE)



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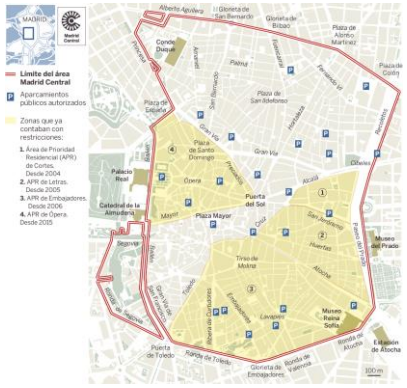
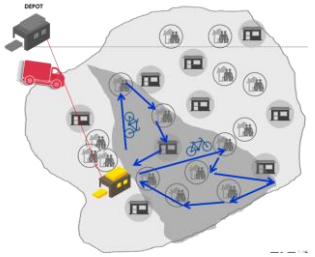
Value case scenarios

- 4 different ones based on location, mostly:
  - #1: Microplatform at San Fernando de Henares (“Hotspot for the e-commerce in Spain”
  - #2: Microplatform at city centre (with vehicle restrictions)
  - #3: Microplatform at Ring Road “M30”
  - #4: Microplatform at city centre (without vehicle restrictions)





Results:
Location is key
Ideal: #3
Most feasible: #2

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Community of Practice

Municipalities/Local authorities:

- AYUNTAMIENTO DE MADRID
- AYUNTAMIENTO DE LEON
- AYUNTAMIENTO DE ALCOBENDAS
- EMT

Sector associations (logistic sector):

- UNO
- AECOC
- CITET
- CAPILLAR
- AEDISMA
- ATA-MADRID
- CETM
- CMTC
- ATA-MADRID
- FENASDISMER

Neighbour associations:

- FEDERACIÓN REGIONAL DE ASOCIACIONES VECINALES DE MADRID
- COORDINADORA VECINAL MADRID CENTRO

Local commerce associations:

- ASOCIACIÓN DE COMERCIANTES, AMIGOS Y VECINOS DE LA PLAZA MAYOR DE MADRID Y SU ENTORNO
- ASOCIACIÓN DE COMERCIANTES BARRIO DE LAS LETRAS

Others:

- PEDALIBRE Y CONBICI

- 17th NOV 2021 (online): kick-off, introduction, context
- 17th DEC 2021 (online): scenarios' assessment (definition, strengths and weaknesses, ranking)
- 14th JUNE 2022 (physical): Local workshop (defining KPIs, validating business models)

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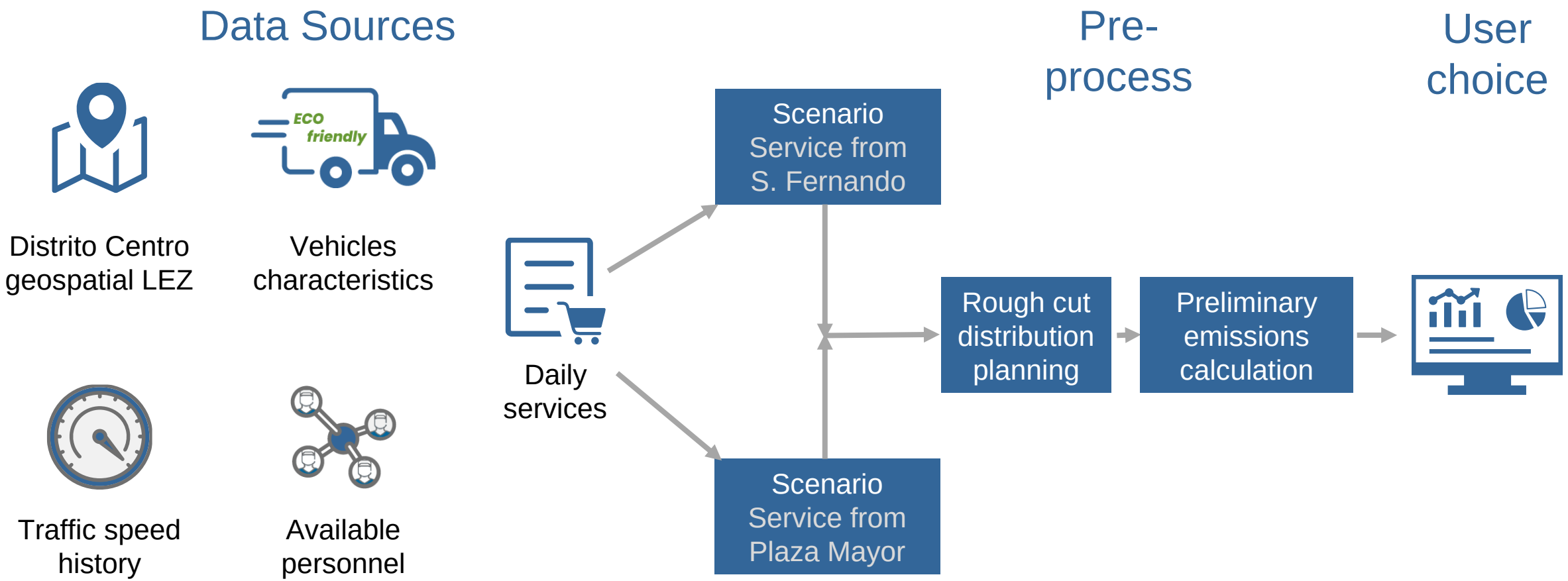
DT Workflow (1)



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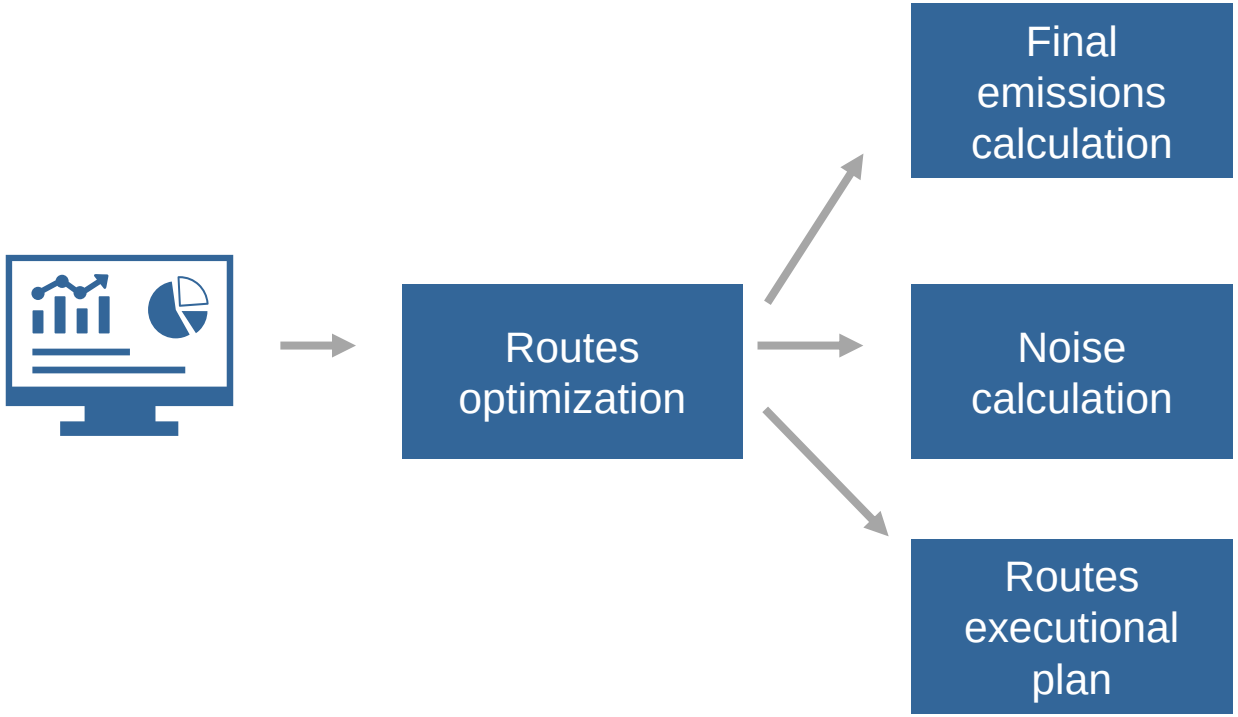
DT Workflow (2)

User Choice

Final process

Open Data repository



Open Data set available for researchers, external city stakeholders and businesses interested in developing routing and scheduling algorithms in last-mile logistics

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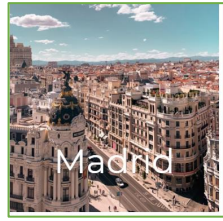
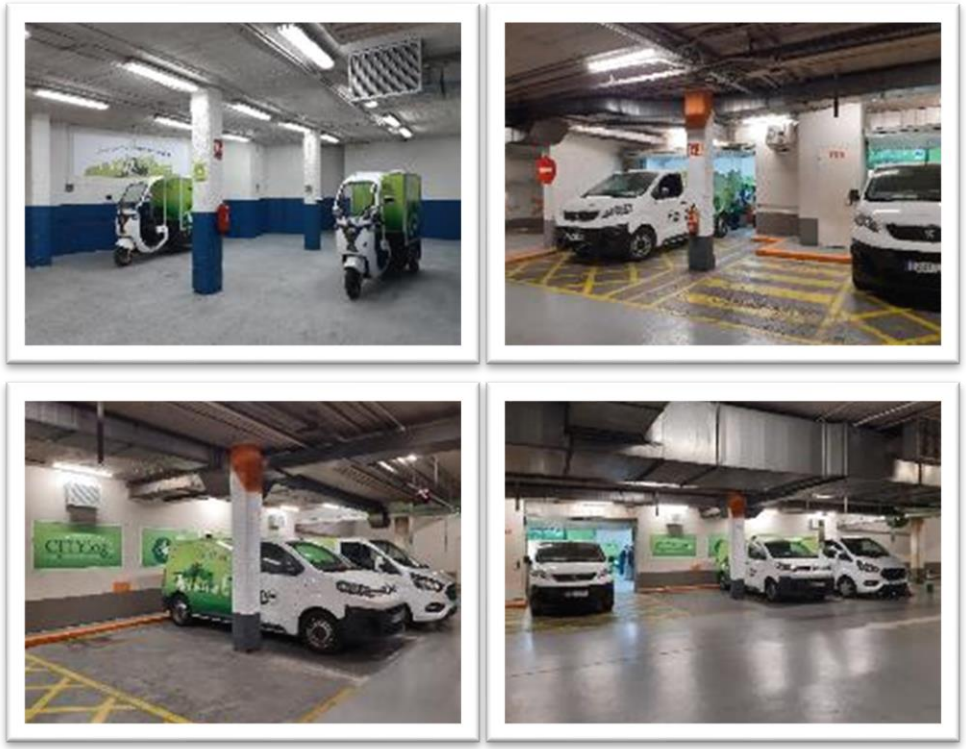
LEAD



Pilot results

Since October 6th, 2021!!



- 1,500-2,000 daily deliveries!
- Up to 15 clean vehicles!

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CITYlog in
Urban & eco-friendly logistics
www.citylogin.es

December 1st 2021 to Oct 30th 2022 – As-Is

Working days	Nº of services	Km. driven
276	57.710	79.793

Open Data Repository

Open Data set available for researchers, external city stakeholders and businesses interested in developing routing and scheduling algorithms in last-mile logistics

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December 1st 2021 to Oct 30th 2022 – As-Is

Services/day	Min.	Max.	Avg.
	34	1.326	209

Vehicles/day	Min.	Max.	Avg.
	1	20	4

Km. driven/day	Min.	Max.	Avg.
	77	1.430	290

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December 1st 2021 to Oct 30th 2022 – As-Is

Services/vehicle	Min.	Max.	Avg.
	34	74	56

Vehicle capacity utilization	Min.	Max.	Avg.
	21%	46%	35%

Km. driven/vehicle	Min.	Max.	Avg.
	66	110	82

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LEAD

UCC KPIs at operational capacity (1.000 parcels)

1st echelon Transit Hybrid 161 parcels – 2nd echelon Electric 3 wheelers 34 parcels

Service from	Leg	Total Journey	Driving time	Serve time	Break time	Km driven	Nº of Services	Nº of Vehicles
S. Fernando	Last-mile	**140:00**	**32:54**	**98:36**	**08:30**	**1.261**	**1.000**	**18**
Plaza Mayor	Delivery to UCC	09:20	07:00	02:20		420		7
	Last-mile	94:05	20:21	65:44	08:00	469		16
	Total	**103:25**	**27:21**	**68:04**	**08:00**	**889**		**23**
		26 %	**17 %**	**31 %**	**6 %**	**30 %**		**23 %**

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UCC KPIs at average capacity – 223 parcels

1st echelon Transit Hybrid 161 parcels – 2nd echelon Electric 3 wheelers 34 parcels

Service from	Leg	Total Journey	Driving time	Serve time	Break time	Km driven	Nº of Services	Nº of Vehicles
S. Fernando	Last-mile	**39:07**	**10:36**	**26:01**	**02:30**	**406**	**223**	**5**
Plaza Mayor	Delivery to UCC	02:40	02:00	00:40		120		2
	Last-mile	26:39	06:04	18:35	02:00	148		4
	Total	**29:19**	**08:04**	**19:15**	**02:00**	**268**		**6**
		25 %	**24 %**	**26 %**	**20 %**	**34 %**		**20 %**

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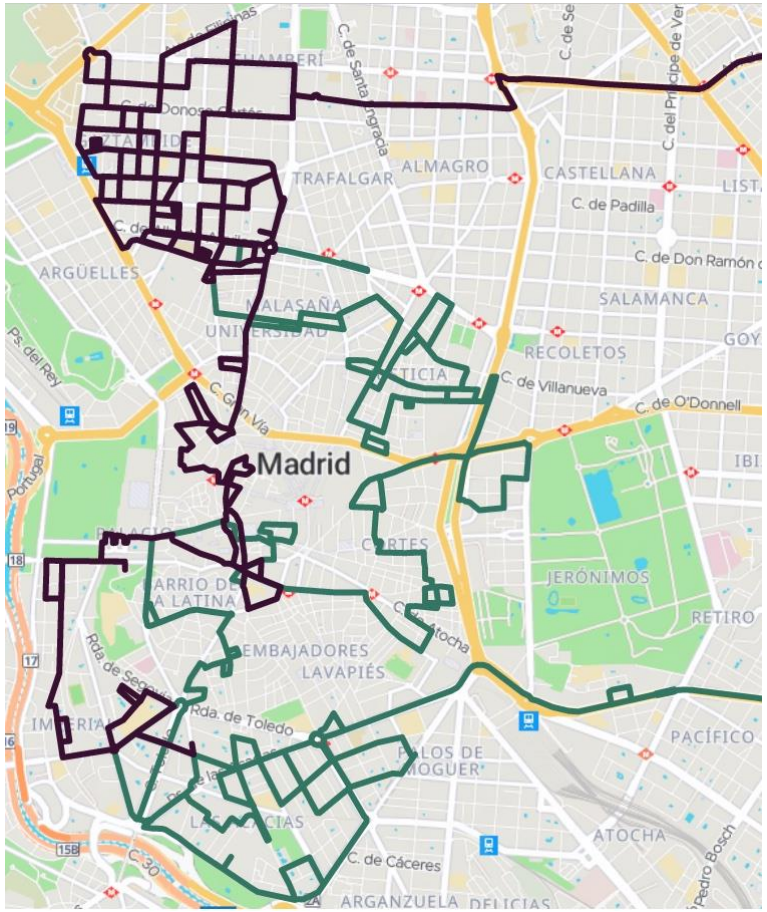
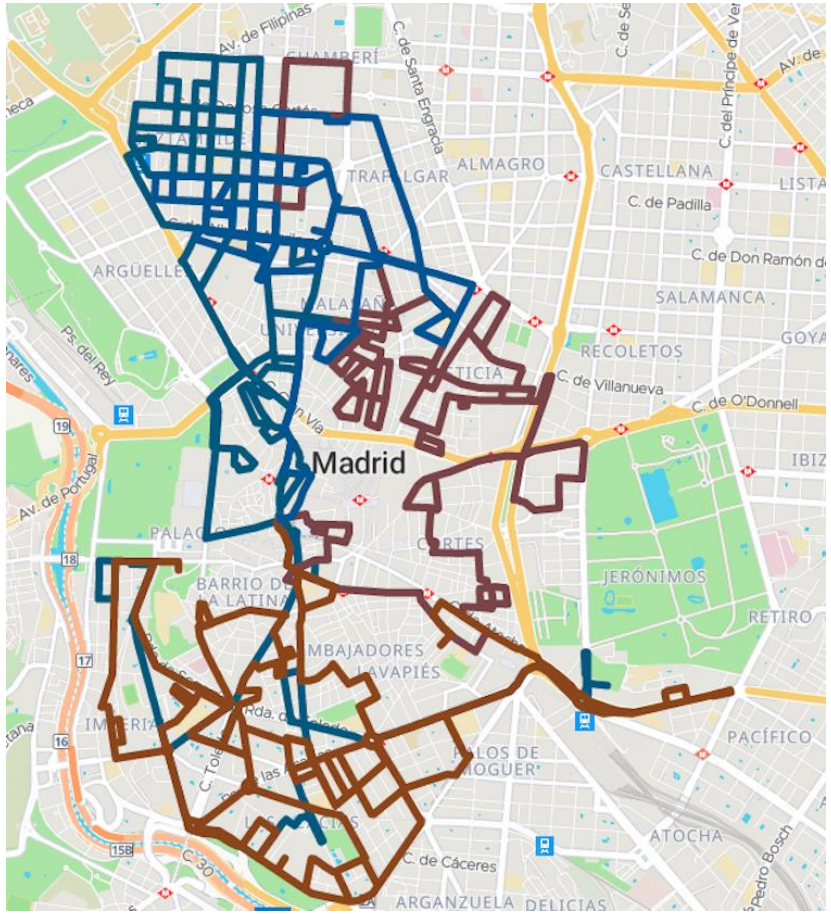
As-Is vs To-Be scenario





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Impact on employment

12 new jobs have been created for the start-up of the UCC

- 3 positions of Traffic Manager: Organisation of cargo, follow-up of deliveries, management of driver incidents, customer service
  - One shift every day of the week, rotating weekends.
  - 40 hours per week.
  - Positions filled by promotions of delivery drivers from other operations.
- 9 delivery driver positions in charge of making deliveries
  - Single shift, every day of the week, rotating weekends with 2 consecutive days off.
  - 40 hours per week.
  - Positions filled by transfers from other operations due to work-life balance and new recruits.

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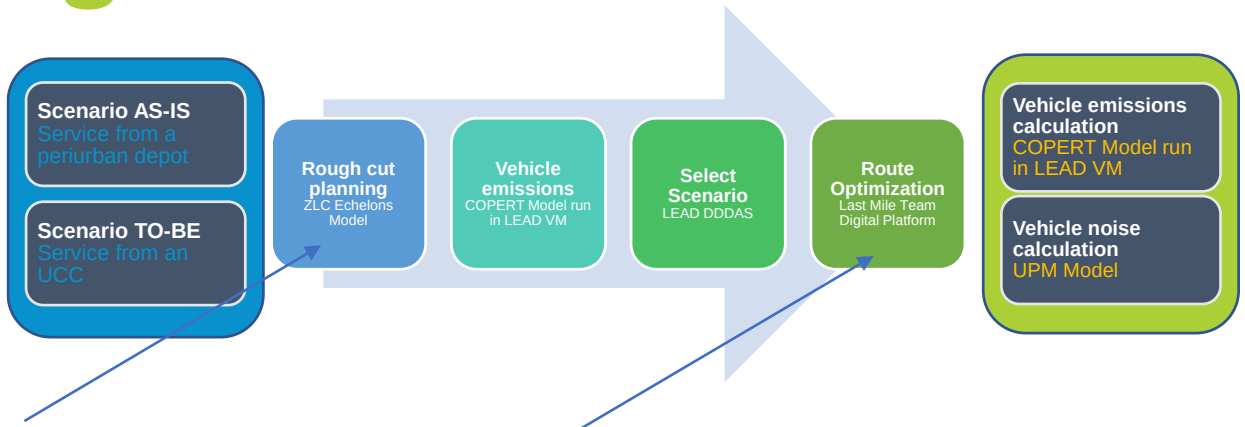
Madrid Digital Twin outcomes Advantages



- First step (Preliminary Planning) is **FAST**
  - Answer "what if" questions
  - Vehicle type, definition of ZBEs ...
- Second step (Route Optimisation) can be executed with **current software**. LEAD provides **guidance for connection** to COPERT and other models.

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Madrid Digital Twin outcomes
Areas of improvement

- Only includes the **central LEZ** of the city (Distrito Centro)
- Only responds to **e-commerce packaging** (parcels)
- To study HORECA or other types of distribution, models need to be **adapted**
- The quality of the solutions depends on the availability and level of detail of the **data**

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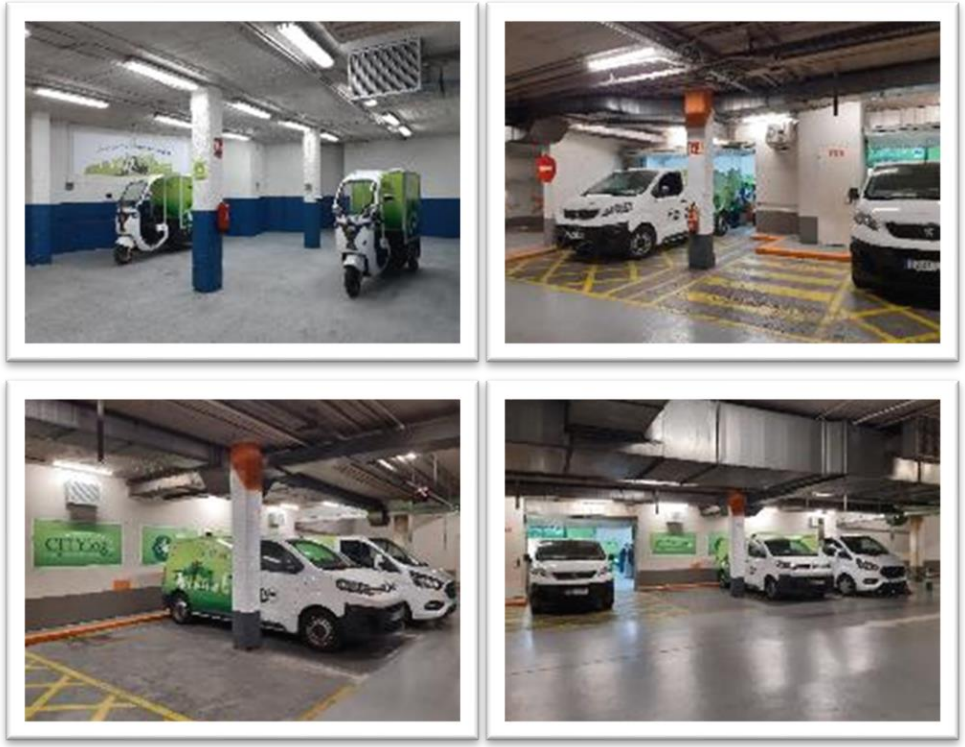
Acknowledge

Madrid's Living Lab has been selected as a **European Best Practice in Sustainable Urban Logistics** by **EIT Urban Mobility**



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Thank you for your attention!

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