



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

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THE CIVITAS INITIATIVE  
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# Empresa Municipal de Transportes de Madrid



- Created in 1947
- 100% owned by Madrid City Council
- 24/7 service
- EMT operates and manages the whole network of public urban buses in Madrid city
- EMT also provides the service of other public mobility services:
  - ✓ Since January 2014, parkings and tow trucks in Madrid city
  - ✓ Since October 2016, the public bike system BiciMAD
  - ✓ Since January 2018, the cable car system
- 440 million passengers (bus), 3.5 million trips (BiciMAD), annually



# Context

- Rise on-demand logistics (accelerated by COVID-19 new online purchasing habits) → stress last mile delivery systems
- Customer: responsive system for customised products
- Industry: instant delivery
- Cities: possible negative consequences.

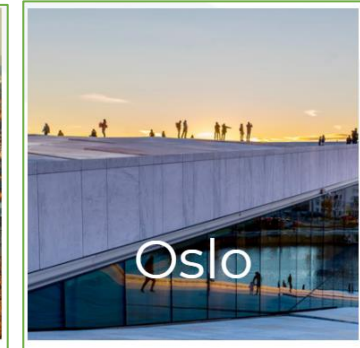
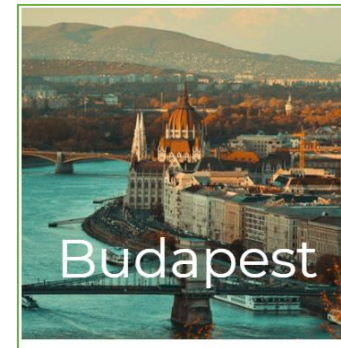
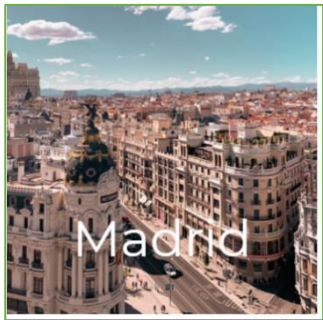
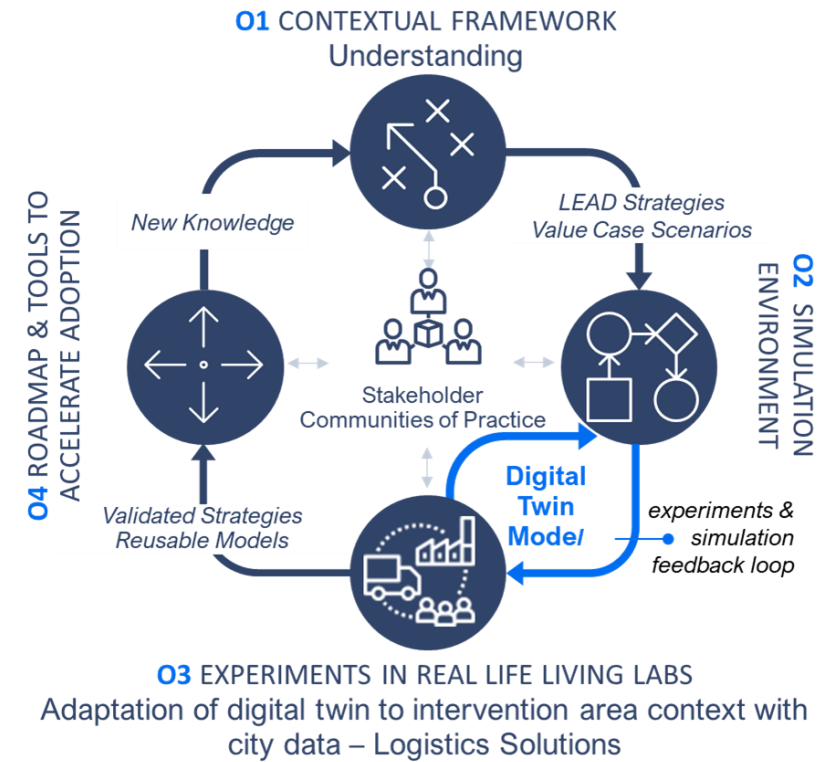
Urban planner + city authorities + stakeholder =  
prediction, evaluation, new business models

- **LEAD**: develop logistic solutions ↔ Low emission operations, adaptive model & Digital Twins models

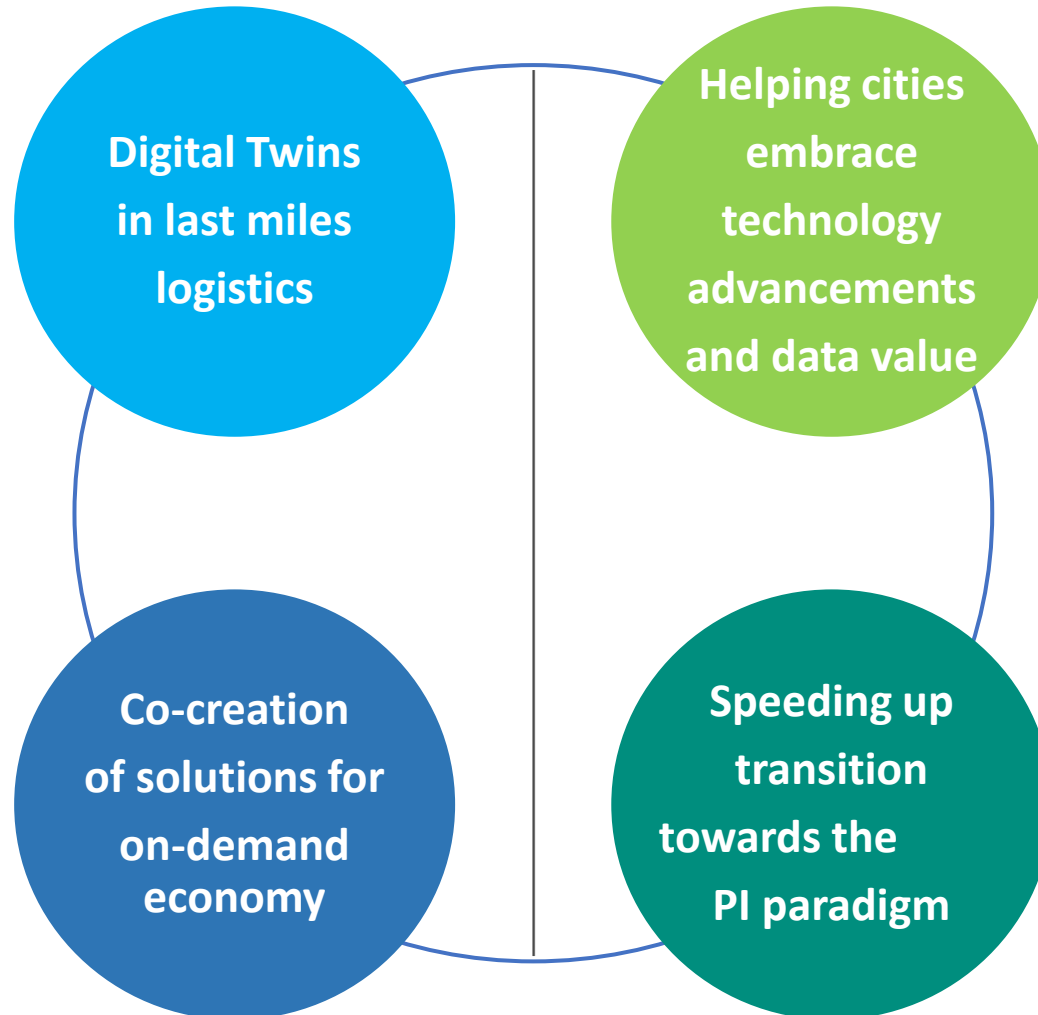


# What is LEAD?

- LEAD – Digital Twins creation in 6 cities (TEN-T urban nodes)
- Solutions → case scenarios



# LEAD Innovations



Living Lab (LL) is a stakeholder-centered ecosystem, operating in an urban node context, for the systematic evaluation of innovative ideas and technological solutions in real life use cases.



# Expected Impacts

## Impact 1

- Clear understanding of cost-effective strategies, measures and tools to achieve essentially zero emission city logistics in major European urban centres by 2030.

## Impact 2

- New tested, demonstrated practices and solutions for better cooperation between suppliers, shippers and urban/regions policy makers (planners)

## Impact 3

- Clearly provide inputs for the preparation and implementation of SULPs, SUMPs and other planning tools (big data and real-time traffic management)





The Hague

# Living Lab

Integrated last-mile logistics with demand-supply matching platforms

## Description

- Context: Central Innovation District (CID), with the re-development of nearby area with new housing, high value industry & services, in a densely used location.
- Vision for new mobility for CID
  - Mobility hub as guiding physical object
  - Multi-user, multi-facility point for all
  - Use is guided by digital platforms
- Mission: to connect **shared freight** movements around mobility hubs via a digital freight fulfillment platform.

## Ambition

The following elements will be explored:

- The potential of integrating crowdsourcing in last mile urban deliveries;
- Whether crowdsourced delivery is an answer to the growing expectations of customers for a faster, more personalised and cost-efficient delivery service;
- Business models, challenges and success factors for new players in the industry;
- New digital service platforms with algorithms that allow the interconnection of crowdsourcing services.



# Living Lab

## Turning Retail stores to electric vehicles charging stations



Porto

### Description

- The capillarity and convenience of retail stores networks (in Portugal Sonae operates 697 stores), provides a possibility of using them as B2B and B2C electric charging docks. This creates an advantage in the expansion of such grids and sustains a business case that mixes energy distribution, retail, logistics and transportation, leveraging & integrating synergies from all markets.

### Ambition

The following elements will be explored:

- The optimisation of delivery routes for EDV's, taking into consideration the potential grid of EDV charging stations;
- EDV's take-up projections if the grid enables mass adoption;
- The development of new business models (e.g. dynamic pricing, incentives research, cost optimisation, demand forecast, emissions and supply planning);
- Leveraging Sonae's digital platform to capture additional e-commerce growth, with new services to consumers (and also on physical stores);
- Last Mile optimisation for e-commerce (and physical stores) deliveries based on PI principles.



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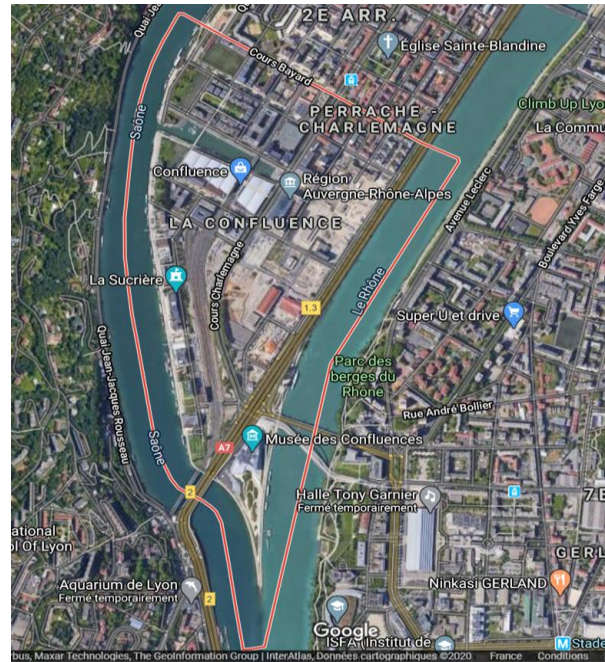


# Living Lab

Three-echelon  
urban logistics  
integrating  
Automated Vehicles

## Description

- The Living Lab will test a three-echelon logistics solution with larger depots residing outside of the restricted traffic zone, connected via shuttles to smaller depots within the Confluence area, and subsequently connected to the final clients (shops/consumers) via small sustainable delivery means such as electric cargo bikes and autonomous delivery robots. The disruptive aspects include the use of existing parking infrastructure as an inner-city logistics hub and the combination of AVs/small EDVs for the last mile distribution.



## Ambition

The following elements will be explored:

- Equip the urban planning team with a decision support framework to better evaluate the implementation of various logistics;
- Reduce motorised flows;
- Implement a robust and flexible logistic infrastructure to support innovative solutions;
- Foster sustainable and economically balanced approaches;
- Leverage public policies to cope with socio-environmental objectives;
- Promote partnership governance.





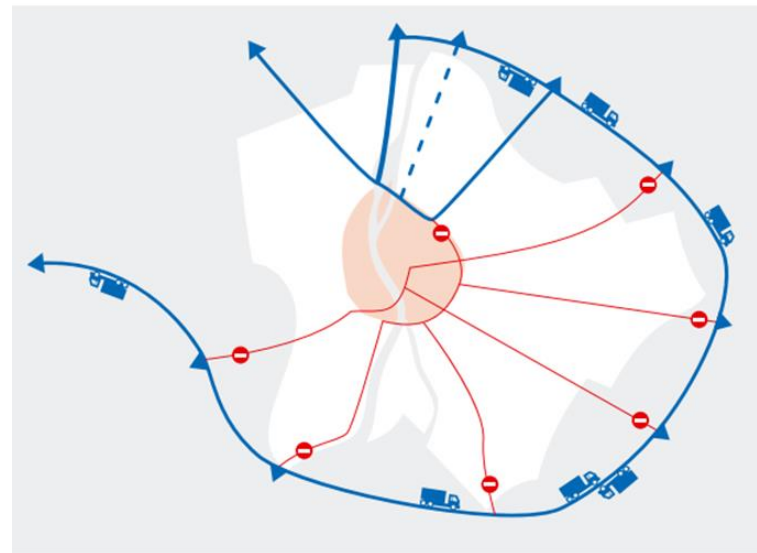
Budapest

# Living Lab

## Spatial Planning of Inner-City Loading Areas

### Description

- Context
  - important logistics area,
  - concentrated population,
  - increased street level air pollution,
  - curfew season: the spring of home delivery,
  - free parking during COVID curfew,
  - timing of scheduled freight deliveries to city centre,
- Objectives:
  - LL observations and framework to provide solutions and to quantify the different effects of the e-mobility to transportation scenarios.



### Ambition

The following elements will be explored:

- advantages of UCCs, optimal distance from endpoint,
- Digital Twin with existing macroscopic transport model,
- impacts of UCCs on air quality,
- ways to refine and develop policies,
- impacts of freight vehicles from UCCs on the environment,
- Exploring additional means to emphasize and promote e-mobility.





# Living Lab

## Green Crowdshipping through the mass transit network

### Description

- The Oslo value case concentrates on B2C and home-deliveries representing the most preferred option from a consumer's perspective.
- It considers, at least, two locations: Oslo Central Station (end point of TEN-T corridor 1) and Økern Metro Station.
- The flexible service envisaged involves a pre-determined sequence of operators, namely: commuters, Nimber community members and regular logistics operators (trade-offs between costs and reliability issues).



### Ambition

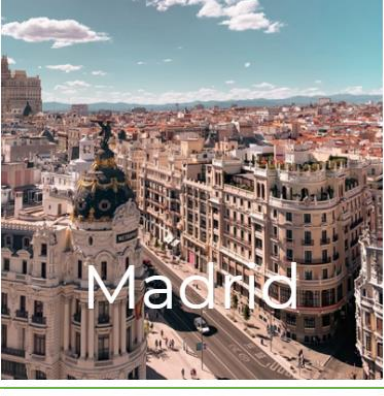
The following elements will be explored

- Business models financially viable and beneficial from a social/environmental perspective;
- Senders'/bringers'/receivers' preferences for alternative delivery service concepts;
- The interplay between demand and relevant supply design of crowdshipping services;
- The role for parcel lockers to enhance delivery/pick-up flexibility;
- The economic, financial and environmental potential for a green crowdshipping service;
- The Integration of data modeling (Discrete Choice Modeling & Agent-Based Modeling) with real-market data to support a Digital Twin approach.



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# 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,
- Madrid LEZ and current regulations (Madrid360),
- 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**.



# 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



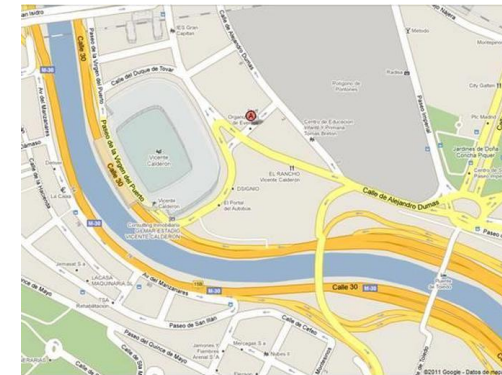
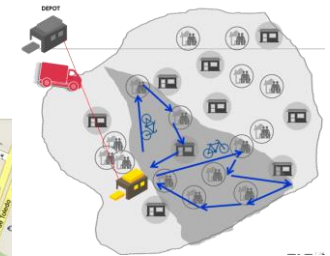
## 2 meetings so far:

- 17th NOV: kick-off, introduction, context
- 17th DEC: scenarios' assessment (definition, strengths and weaknesses, ranking)

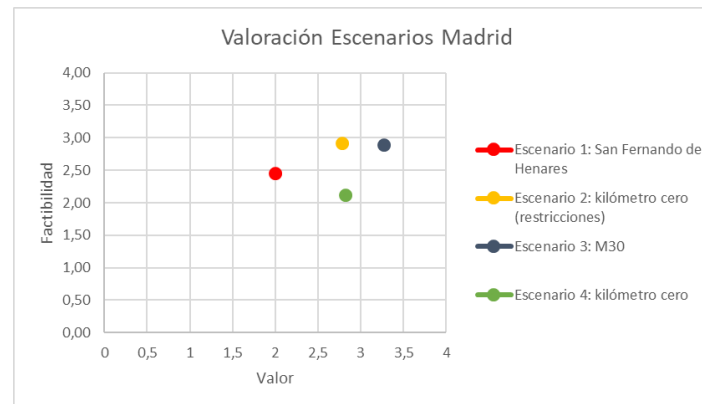


# Value case scenarios

- 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



# Pilot setting

- Location decided (Plaza Mayor)
- Paperwork ready (EMT-CityLogin)
- Starting operations: scheduled along summer 2021



# Partners



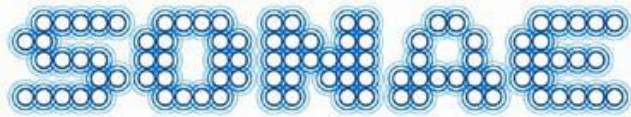
Den Haag



Molde University College  
Specialized University in Logistics



CITIES AND REGIONS FOR TRANSPORT INNOVATION



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# Contact us!

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