



# Transpolis

## COMMITTED TO A BETTER ROAD SAFETY

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Transpolis is the world-class center for innovation and development in the field of safe and sustainable vehicles and infrastructures.

**TRANSPOLIS**

UNIQUE MOBILITY LAB IN EUROPE DEDICATED  
TO URBAN MOBILITY

[See the official video](#)

# »»» Transpolis



Backed by CARA, the French transport and mobility cluster with a visionary approach :

- To develop the dialogue between vehicle & infrastructure industries
- The mobility ecosystem needs a place to demonstrate innovations

**2011** Transpolis SAS - Private company  
Public / private ownership  
Université Gustave Eiffel as a major shareholder



200 ha of proving ground located between Lyon and Geneva

# 3 STRATEGIC ACTIVITIES / OUR DNA = ROAD SAFETY



**SAFETY OF INFRASTRUCTURES**  
**Crash testing equipment**  
**30 years of experience**  
**ISO certified - COFRAC**



**SAFETY OF PASSENGERS**  
**Abdominal pressure sensors**  
**UNECE R129 – C-NCAP**




**SAFETY OF VEHICLES**  
**ADAS – CAV – V2X**  
**ISO certified - COFRAC**

# Transpolis

- Accreditations : ISO 17025 & ISO 9001
- Official candidate for Euro NCAP - Active safety
  - ✓ Committed to the commercial vehicles working group
- Candidate to become a technical service for the French state for Heavy vehicle ADAS regulations
- Contributor to the French national automated vehicle strategy
  - WG ARTS
  - WG connectivity
  - WG Scenarios
  - WG Qualified bodies
- Participant to BNA/CN ADAS
- UNECE WP29 auditors



A person in a dark jacket and light-colored pants is walking from left to right across a road. In the background, a dark-colored car is parked or moving slowly. The entire scene is overlaid with a dark blue semi-transparent filter. The text is centered over the image.

**Facing safety challenges of  
automated and connected vehicles  
in complex urban environments**



# A strong expertise

Working on safety validation of L4 automated public transport vehicle since 2017

4 projects examples:

## STAR



- **Objective:** to develop a demonstrator of a 12m L4 automated bus able to reach 40kph
- **Founding:** FUI – 6.5M€ - 2.5M€ of grant
- **Partners :** IVECO bus, Easy Mile, IFSTTAR, INRIA, ISAE-Supaero, Michelin, Sector & Transpolis
- **Duration:** 4 years : 2017 – 2021
- **Transpolis** is in charge of the test plans and has run the validations

## Groupama Stadium – N1



- **Objective:** to secure the deployment of an automated shuttle service near Lyon stadium for the European AVENUE project +
- **Customer :** KEOLIS Lyon (transport operator)
- **Transpolis** used its tracks to run shuttle tests

# A strong expertise

Working on safety validation of L4 automated public transport vehicle since 2017

4 projects examples:



expérimentations  
navettes autonomes



- **Objective:** to gather knowledge about the operation of transport services using autonomous shuttles
- **Founding:** ADEME – call EVRA – Budget 15,8M€
- **Partners:** Sophia-Antipolis, Cœur-de-Brenne, Univ. G. Eiffel, ENTPE, Berthelet, Eiffage Energie Système, Navya, Sector, EDF, Instant System & Transpolis
- **Duration:** 4 years : 2019 – 2023
- **Transpolis** works on protocols, organizes critical scenario tests, contributes to the study of comfort and safety of the passengers



- **Objective:** To learn how to approve an automated vehicle programmed with AIs - use cases: autonomous shuttles
- **Founding:** BPI– 12.6M€ - 500k€
- **Partners:** Univ. G. Eiffel, UTAC, ANSYS, APSYS, AVS, CEA, CEREMA, EASYMILE, ESI, IGN, INRIA, LNE, Navya, Oppida, ATC (P2C), RATP, Sphera, SystemX, Valeo & Transpolis
- **Duration:** 3 years : April 2021 - 2024
- **Transpolis** contributes to both simulation and physical test methodologies

# + Basic principle to secure a L4 vehicle deployment (up to now)

1. Analyse the pathway of the future service (operational domain)

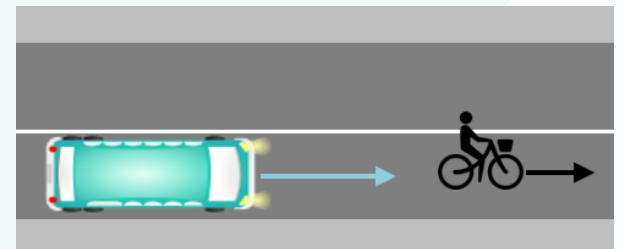
- ❖ Infrastructures : road geometry, intersections...
- ❖ Others road users : cars, trucks, pedestrians... and their behaviours and habits
- ❖ Special conditions : lightings, weather...



2. Infer all the relevant scenarios the AV will meet (more or less critical)

3. Test that the vehicle/system is able to handle all these scenarios

- ❖ Simulations
- ❖ Tests on tracks
- ❖ Real world when preparing the deployment



4. Operate the service with a safety driver (still an experiment)

5. Record incidents and operation events

6. Analyses & feedback





# + Transpolis City area

- About 30 hectares, 12km of urban streets
- ▲ 2 boulevards – about 500 meters long, with 6 lanes, T1 French axial marking. Bus and cycle lanes created on request
- 🏠 4 sections with different layouts: intersections / crossroads / winding streets / parking slots / double bends...
- Ring road: 1755 meters around the City Area, 3 lanes, with 4 access lanes
- 🏠 40 buildings: a veritable city with real buildings to test connectivity (LOS/NLOS scenarios)
- ⚙️ Adjustable facilities: roving sidewalk and façades changing - message sign – flexible intersection configurations
- 🚦 Road equipment: urban lighting, movable signs – traffic lights with GLOSA services - bumpers – roundabouts – bus stops
- 🚧 Road marking: traffic lanes – crosswalks – luminescent lanes

- ✓ Range of driving environments: surfaces (asphalt, paved streets, damaged road) – vegetation – sloping
- 🅑 Modular zone covering 7000 m2 – parking or event area
- 🔌 Connection and Energy: 60 cabinets with optic fiber & 220V plugs, EV charging station



# + Testing scenarios on tracks

- ❖ Reproduce the configuration on our tracks
  - Infrastructure, markings, masking...
  - Depends on vehicle perception
- ❖ The other road user behaviours
  - For none critical scenarios, tests with real users
  - **For critical scenarios, tests with soft targets**

➔ Testing pedestrian/VRU crossing scenarios with iterations up to the collision to characterise the performance of the automated vehicle

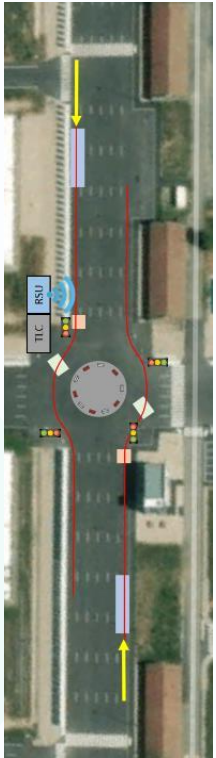
The vehicle limits are known, but are they safe enough?

➔ Basic scenarios with one or two dummies  
Human behaviour can be much more complex  
Experiment feedbacks are very valuable

Real shuttle path



Shuttle path @Transpolis



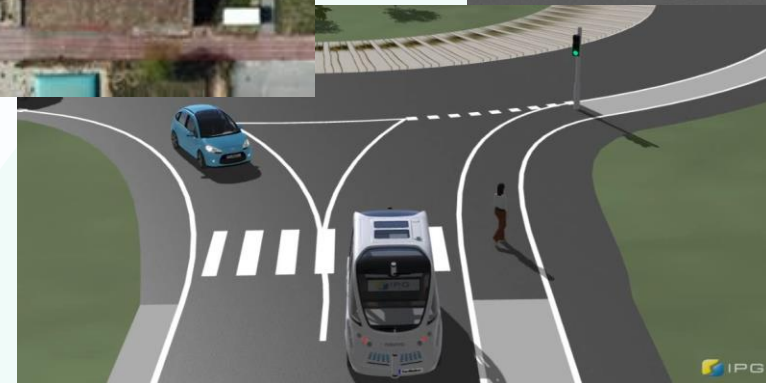
## + Next steps

A new legal framework to be applied:

- NATM : New Assessment/ Test Method (UNECE GRVA working group)
- ADS Act : EU 2022-1426 : uniform procedures and technical specifications for the type-approval of the automated driving system (ADS) of fully automated vehicles
- French decree n°2021-873 (June 29th, 2021) defines the safety demonstration process for the deployments of Automated Road Transport Systems (ARTS)

Continued R&D efforts:

- ✓ ODD validation
- ✓ Scenario databases
- ✓ Complex scenarios on tracks
- ✓ Virtual testing
  - Future pathway model + vehicule
  - Digital twin of our tracks + VIL
- ✓ Connectivity tests



# Transpolis

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**Intertek**

- ✓ Transpolis is a quality accredited center
- ✓ CIR / CII authorisation



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