



Demonstrating fully automated road-based passenger transport systems in cities

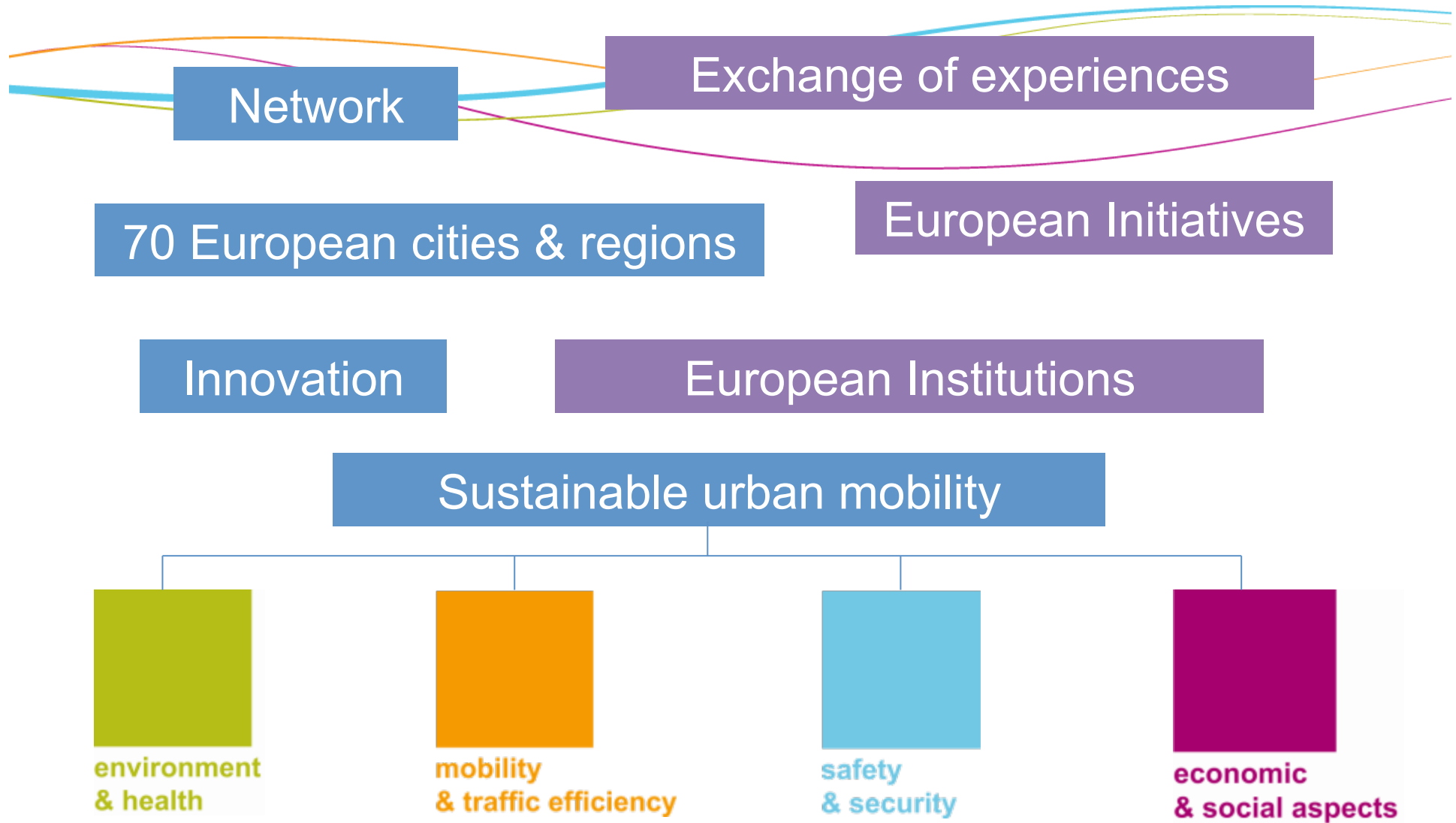
Suzanne Hoadley
Polis

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What is Polis ?

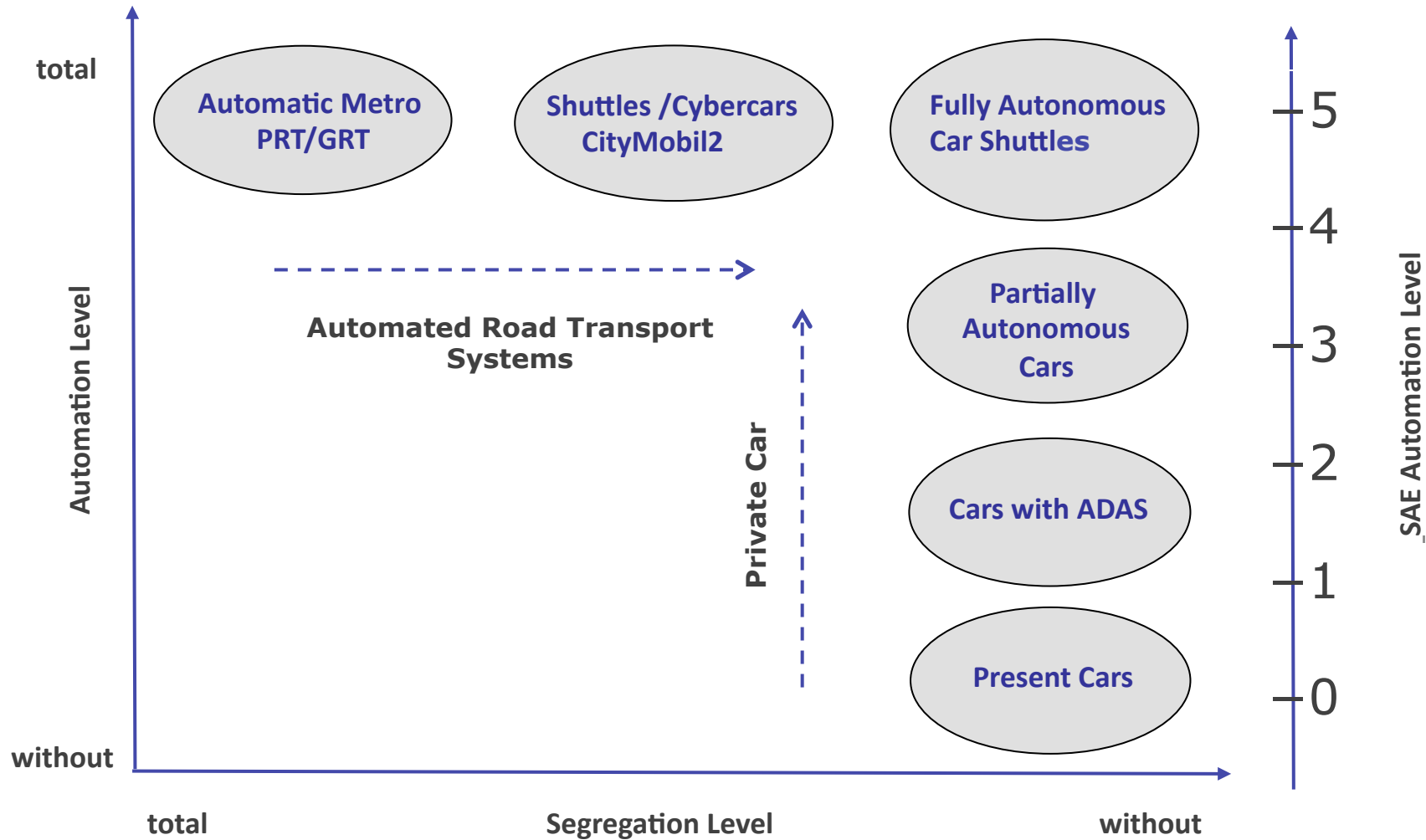


Polis & automation

- Much R&D and media coverage about automation (accelerated by Google car)
- EU has a strong policy to deliver automation (GEAR 2030, H2020, etc)
- Many claims are made about positive 'efficiency and safety' benefits of automated cars
- There has been little research on likely **mobility impact** of fully automated cars – ITF study suggests that driverless cars may increase km travelled.
- Little attention given to the role of **automation in collective passenger transport** – yet much interest in this among transport authorities
- While full automation may be many, many decades away, more and more driving tasks will become increasingly automated – what impact will this have on **traffic management, travel** and **driver behaviour**, etc?
- The **role of the infrastructure** (especially digital infrastructure) in enabling connectivity and contributing to automation is often raised. What does this imply for cities?

Two main trends in road automation

European
Commission



What is CityMobil2?

- Demonstrated ARTS (Automated road transport systems) on public roads
- Developed a safety assessment procedure which can be applied at national level for certifying ARTS
- Investigated the interaction of VRU with ARTS

The CityMobil2 vehicles



Selected CityMobil2 demo sites



Trikala: demo in city centre

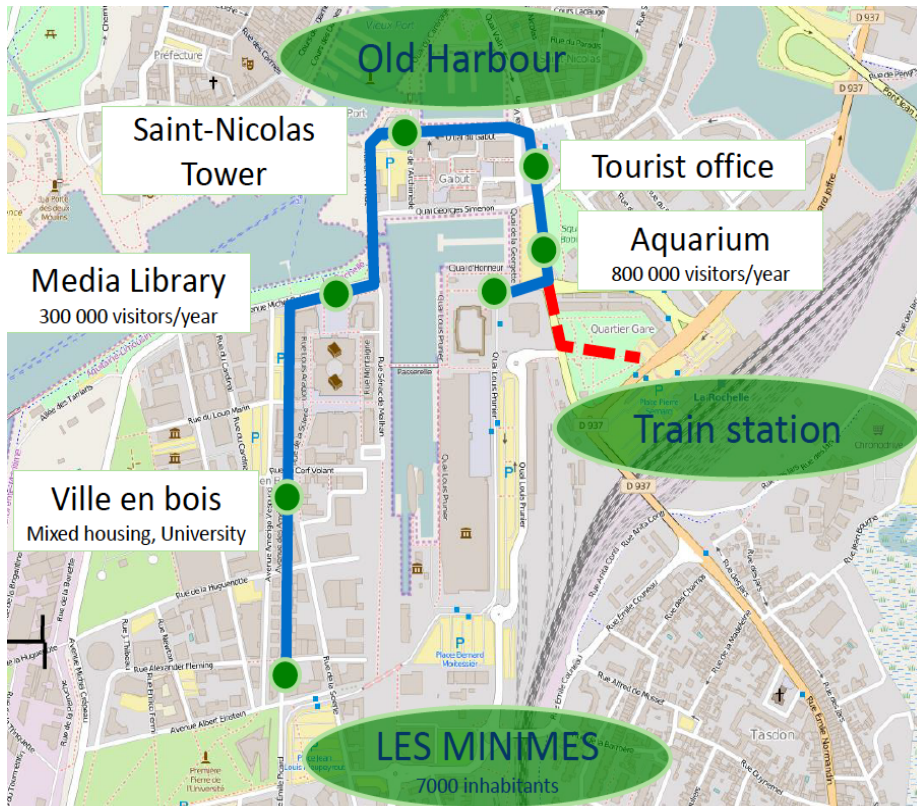


- ✓ Dates: September 2015 – February 2016
- ✓ Vehicles: Robosoft Robucity
- ✓ Route length: 2.5 km
- ✓ Number of trips: 1490
- ✓ Distance covered: 3,580 km
- ✓ Number of passengers: 12,138

Trikala



La Rochelle: demo in town centre



- ✓ Dates: December 2014 – April 2015
- ✓ Vehicles: Robosoft Robucity
- ✓ Route length: 2,6 km
- ✓ Distance covered: 3,778 km
- ✓ Number of passengers: 14,660

December 2014 inauguration of La Rochelle CityMobil2 ARTS demonstration



Campus EPFL (Lausanne)



- ✓ Dates: April – August 2015
- ✓ Vehicles: EasyMile EZ10
- ✓ Route length: 1.5 km
- ✓ Distance covered: 6,970 km
- ✓ Number of passengers: 7,000



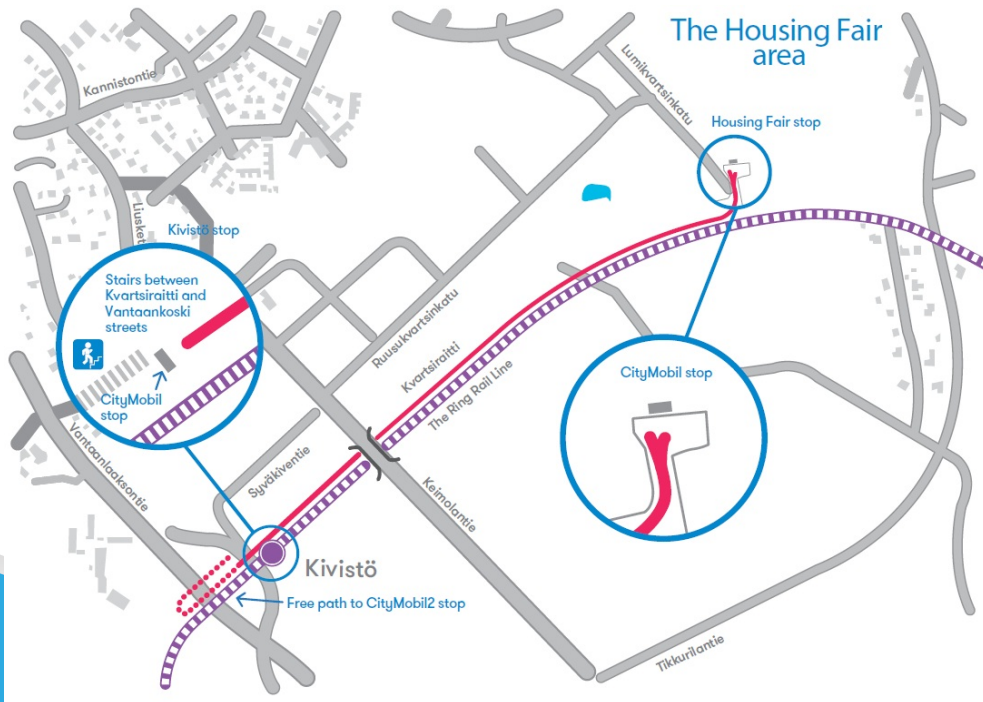
Oristano: demo along a beach front

- ✓ Dates: July – September 2014
- ✓ Vehicles: Robosoft Robucity
- ✓ Route length: 2,7 km
- ✓ Distance covered: 1,794 km
- ✓ Number of passengers: 2,580

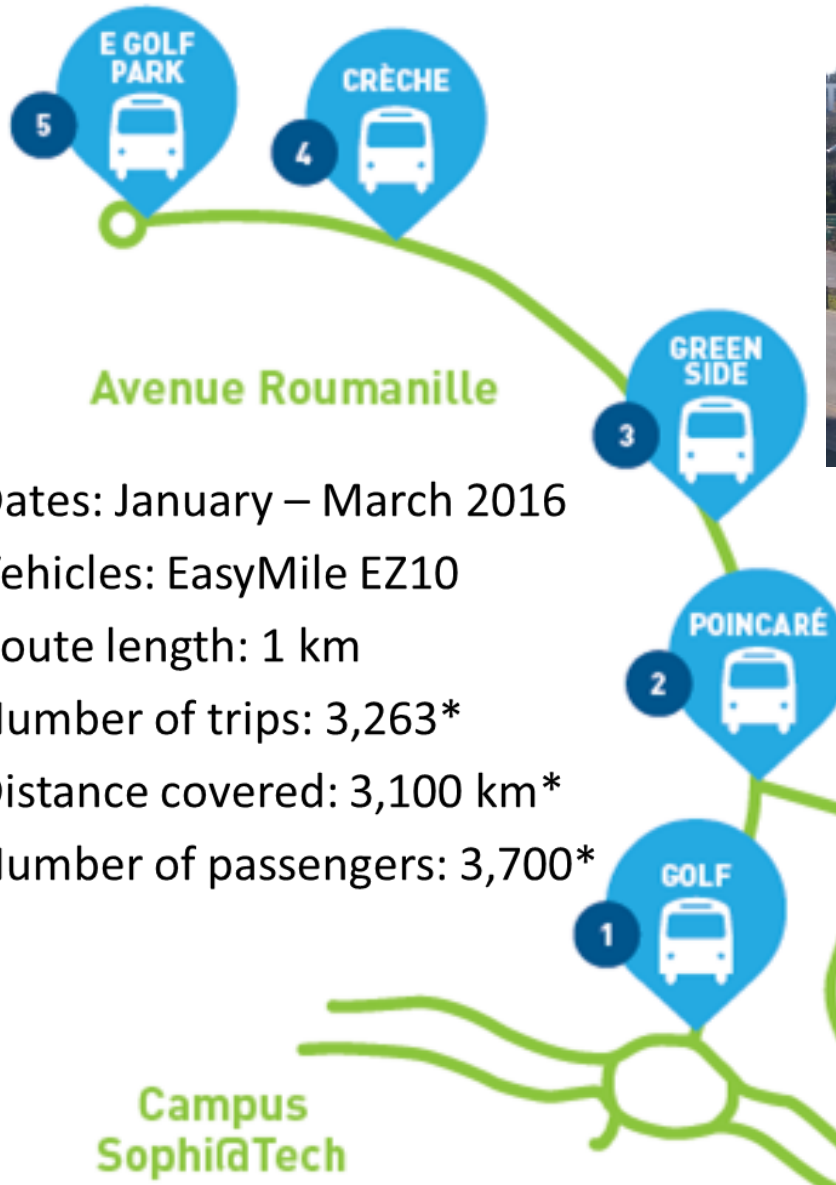


Vantaa : to promote a new suburban centre

- ✓ Dates: July – August 2015
- ✓ Vehicles: EasyMile EZ10
- ✓ Route length: 1 km
- ✓ Distance covered: 3,962 km
- ✓ Number of passengers: 19,000
- ✓ Was held during the Housing Fair 2015,
- ✓ 2 stations: at the Kivistö train station and at the Housing Fair entrance



Sophia Antipolis : demo in business park

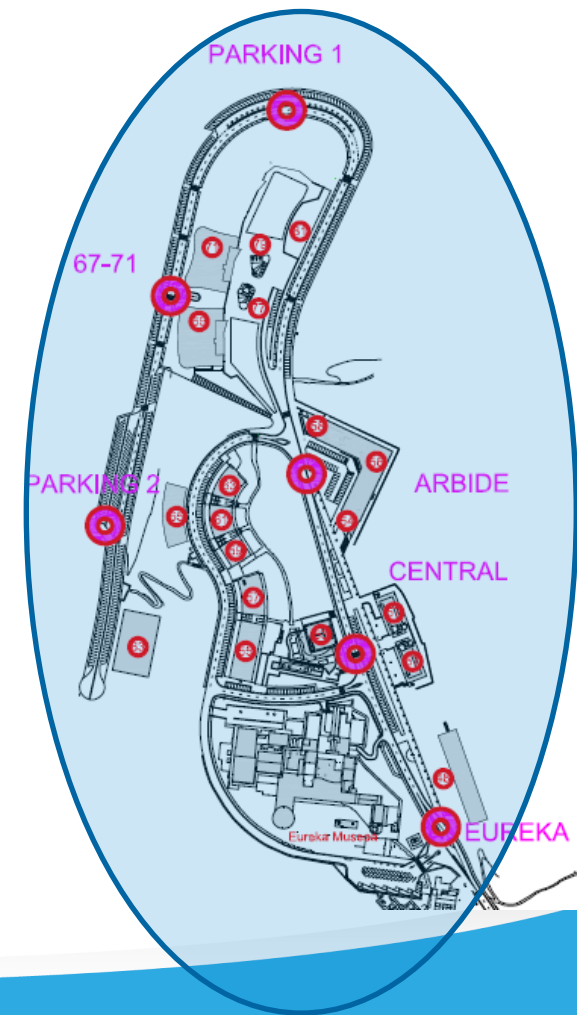


- ✓ Dates: January – March 2016
- ✓ Vehicles: EasyMile EZ10
- ✓ Route length: 1 km
- ✓ Number of trips: 3,263*
- ✓ Distance covered: 3,100 km*
- ✓ Number of passengers: 3,700*



San Sebastian: demo in business park

- ✓ Dates: April 2016 – June 2016
- ✓ Vehicles: Robosoft Robucity,
- ✓ Route length: 1,2 km
- ✓ Number of trips: 1.416 (*)
- ✓ Distance covered: 1.699 (*)
- ✓ Number of passengers: 900 (*)



How many passengers have we carried so far?

• Oristano (Italy)	2 580
• La Rochelle (France)	14 660
• Lausanne (Switzerland)	7 000
• Vantaa (Finland)	19 000
• Trikala (Greece)	12 150
• Antibes (France)	4 000
• San Sebastian (Spain)	Counting
• Total	60 000+

CityMobil2 certification procedure

- Consider not just the **vehicle** but **infrastructure** and **control system** in the certification procedure based on the rail technical standard EN50126
- Divide the infrastructure in sections which, together with the designed systems and the other users, become **use-cases**
- Perform a **risk assessment** on each use-case to verify that the proposed system minimises risks and eventually implement infrastructural, technological or control counter measures
- Each “**certified**” **use-case** can be replicated elsewhere without the need for re-certification

Use cases

Code		MMODD	MMOS
SPF	Straight path, flat	3, 5, 10m	15, 30, 50km/h
CPL	Curved path left	3, 5, 10m	15, 30, 50km/h
CPR	Curved path right	3, 5, 10m	15, 30, 50km/h
SXS	Street crossing with Stop	10m	30km/h
SXL	Street crossing with Light	10m	30km/h
ASt	Approaching station	10m	15km/h
LSt	Leaving station	10m	15km/h
ESL	Entering single lane	10m	15km/h
LSL	Leaving single lane	10m	15km/h

CityMobil2 approach for EU legal framework

1. Harmonising the type-approval procedures
2. Harmonising the authorisation procedures for testing & development of automated road transport systems
3. Setting rules on civil liability

VRU interaction with ARTS

Survey: Safety and Priority?



VRU interaction with ARTS

Identifying and Categorising Conflicts using Videos



What is next?

- Some demo sites want to upscale
- Investment is needed for our small industries to become large ones
- Need to demonstrate the “business/societal case”
- Legal frameworks in more Member States (France, UK, Spain and Italy under discussion)



Thank you for your attention

shoadley@polisnetwork.eu



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