

Coordinated by  **UITP** ADVANCING PUBLIC TRANSPORT

Technical Manager  **CERTH** National Institute for Research and Technology

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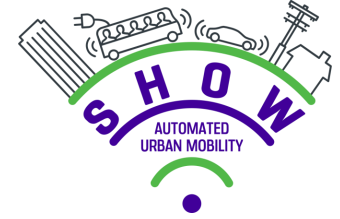
SHared automation Operating models for Worldwide adoption - SHOW At a Glance

18 September 2020 | Virtual Meeting

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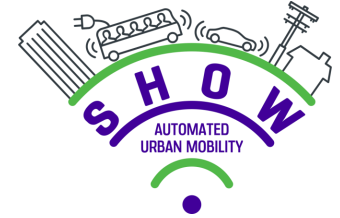


Factsheet



- **Topic identifier:** DT-ART-04-2019: Developing and testing shared, connected and cooperative automated vehicle fleets in urban areas for the mobility of all -
<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/dt-art-04-2019.html>
- **Focus area:** Digitising and transforming European industry and services
- **Type of action:** Innovation Action (IA)
- **Start date:** 01 January 2020
- **Duration:** 48 months
- **Funding:** 29.980.398,57€
- **69 Partners across Europe:** OEM's & PT Operators, Tier 1 & Telecom providers, Other industrial Partners, Citizen engagement entities, SME's, Research & Academia
 - + 10 third parties
 - + 72 letters of support for: Twinning, Replication, Cities, stakeholders & umbrella associations support

The Vision & the Aim



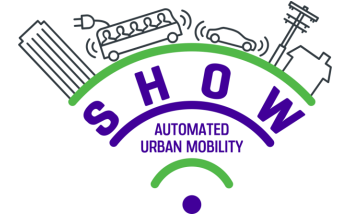
VISION

To support the **deployment of shared connected and electrified automation** in urban transport chains through demonstration of real-life scenarios to promote **seamless and safe sustainable mobility**.

AIM

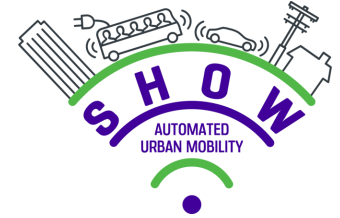
To support the migration path towards affective and persuasive sustainable urban transport through technical solutions, business models and priority scenarios for impact assessment, by deploying **shared, connected, electrified fleets of autonomous vehicles** in coordinated **Public Transport (PT), Demand Responsive Transport (DRT), Mobility as a Service (MaaS) and Logistics as a Service (Laas)** operational chains in real-life urban demonstrations all across Europe.

SHOW in a nutshell



- **Real-life urban demonstrations in 5 Mega, 6 Satellite and 3 Follower Pilots** taking place in **20 cities** across Europe.
- By **deploying a fleet of more than 70 L4/L5 AVs of all types** (buses, shuttles, pods, robo-taxis, automated cars connected with MaaS and cargo vehicles) and for **all transport operators** (passengers, cargo and mixed transport) in both **dedicated lanes and mixed traffic**, connected to a wide range of supporting infrastructure (5G, G5, IoT, etc.) and operating under traffic speeds ranging **from 18 to over 50km/h**.
- Aiming to satisfy **3 UCs families and 17 single UCs**; that together cover all urban automated mobility needs and wants of the stakeholders (i.e. as reported within SPACE initiative and in ERTRAC roadmap).
- Tackling with **Automated PT, Automated DRT, Automated MaaS and robo-taxi fleets & Automated Logistics and LaaS**.

SHOW in a nutshell

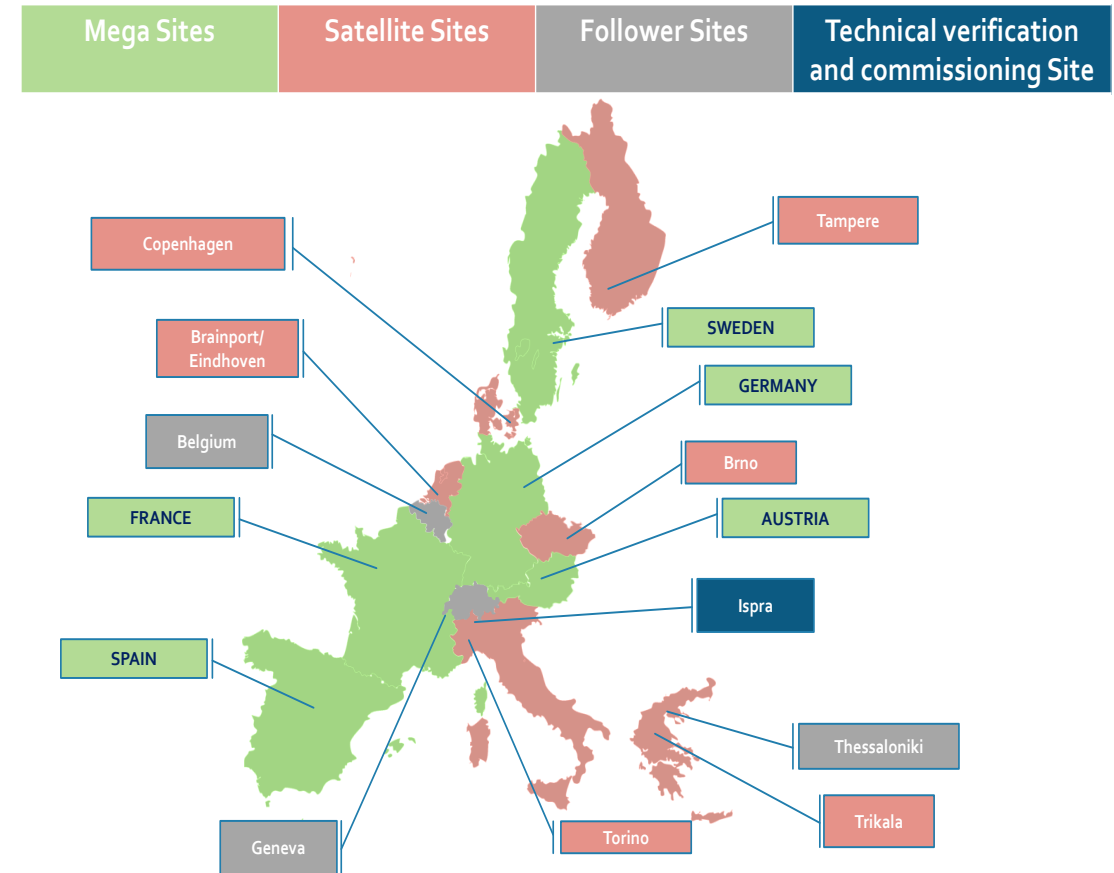


- Applying at least **4 different city traffic automation business models** moving towards **Automation as a Service – AaaS**.
- With project pilots lasting for **24 months**, with **real service seamless operation** in each pilot site lasting at least **12 months**.
- Transporting **AV fleets over 1,500,000 passengers and 350,000 units of goods**.
- Aiming to be the **bigger and more holistic ever real life CCAV urban demonstration initiative in Europe**, user led (by UITP) and realised by a Consortium of **69 Partners, 10 third parties** and with the **additional support of 61 stakeholders** (connected through LoS, including **major stakeholder Associations**) and **twinning actions with 11 organisations** from the US, S. Korea, Australia, China, Taiwan and Singapore.

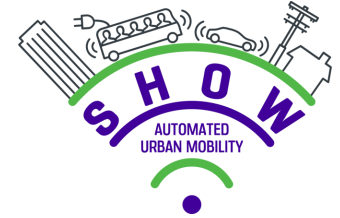
Demonstration Sites



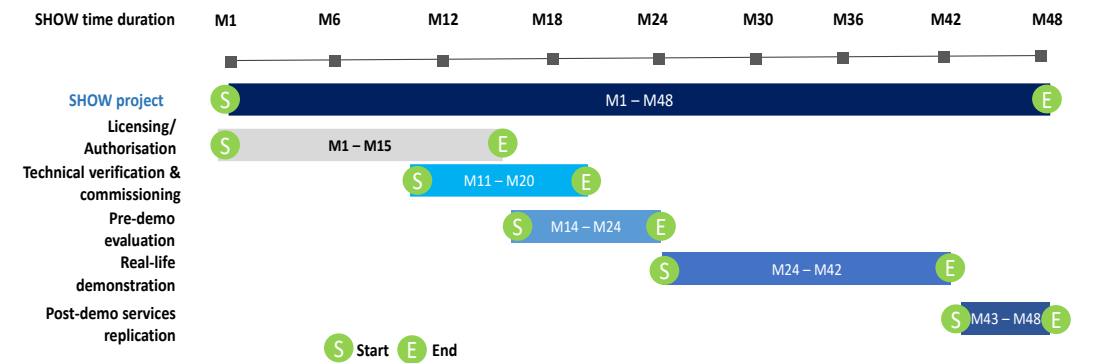
- **Five Mega Sites** – Cities or Agglomeration of Cities
- Satisfying the majority of SHOW UCs and cover all vehicle types, traffic environments (urban, peri-urban, corridors) of varying population and traffic density as well as all key traveller groups.
- Each one demonstrating a **different technological, business and socioeconomic scenario**.
- Different readiness, acceptance, infrastructure, community synthesis in each...need to complement each other.
- **Six Satellite Sites** to **complement** (with regard to technologies, business models, geographical coverage) **the Mega Sites**, with unique characteristics demonstrating specific Use Cases.
- **Three Follower Sites** that **connect current relevant activities without performing additional demonstrations**; still connected and replicating the project.
- **Technical verification and commissioning** in Ispra.
- **At least 10 more Follower Sites** in the course of the project (available LoS)



Pre-demonstration and Real-life Demonstration sites – An overview



Mega sites	Satellites
France: Rouen and Rennes	Finland: Tampere
Spain: Madrid (2 areas)	Denmark: Copenhagen
Austria: Graz, Salzburg, Vienna	Italy: Torino
Germany: Karlsruhe, Mannheim and Aachen.	Greece: Trikala
Sweden: Linköping and Kista	Netherlands: Eindhoven (Brainport)
	Czechia: Brno
Follower sites	Belgium, Brussels Greece, Thessaloniki Switzerland, Geneva



SHOW demonstration time plan

Demonstration Sites: Vehicles & Environments



Megasite/ satellite	City	Vehicles	Environment
France	Rouen	<ul style="list-style-type: none"> • 5 I-Cristal (Shuttle) • 4 Renault Zoe (Robo-taxi) 	Four different solutions will be demonstrated: 1. Automated Vehicles on open road in complex situations 2. Automated PT line connecting activity zone to the center 3. Robo-taxi service within the historic area 4. Connected to the biggest multi-modal hub of the city (dotted line)
	Rennes	<ul style="list-style-type: none"> • 3 Navya (Shuttle) • 3 Easymile (Shuttle) 	A hospital area with transportation of patients
Spain	Madrid, Depot	<ul style="list-style-type: none"> • 1 IRIZAR - i2eBus – (Coach Electric L3) • 2 TECNOBUS - EMT - Gulliver (Electric Minibus L2) 	Restricted area - a modern depot with different bus technologies (CNG, Hybrid, Electric). Semi-Controlled Area Interaction with other non- autonomous buses and vehicles.
	Madrid	<ul style="list-style-type: none"> • 2 RENAULT - TECNALIA - Twizzy (Passenger car – L2) 	Urban and suburban: La Nave (Madrid City Innovation Hub) < – > Villaverde Bajo-Cruce Metro Station 800 m per journey (1,6 km line), driving in open traffic, including roundabouts. Maas concept will be used.
Austria	Graz	<ul style="list-style-type: none"> • 1 Ford Fusion (Passenger car) • 1 Kia e-Soul (Passenger car) 	An automated shuttle service between a suburban train station of Graz and a destination with high traffic demand (shopping centre)
	Salzburg	<ul style="list-style-type: none"> • 1 EasyMile EZ10, Gen 3 (Shuttle) • 1 PT bus/shuttle 	From the City of Salzburg to the peri-urban regions for leisure and recreation activities as well as for commuters, all in mixed traffic on public roads.
	Vienna	<ul style="list-style-type: none"> • 2 Navya ArmaDL4 (Shuttle) • 1 Navy Autonomous Cab (Robo-taxi) 	Urban quarter in the city of Vienna travelling to industrial/commercial park.

Demonstration Sites: Vehicles & Environments



Megasite/ satellite	City	Vehicles	Environment
Germany	Karlsruhe	<ul style="list-style-type: none"> 2 EasyMile EZ10, gen 2 (Shuttle) Audi Q5 (Passenger car) 1 modular vehicle from DLR (in planning) 	Urban and peri-urban city areas and quarters with digital and connected infrastructure and HD-mapping.
	Mannheim	<ul style="list-style-type: none"> 5 (brand tbd) (Shuttles) 	Peri-urban housing area, calmed traffic zone, subordinate access roads, barrier-free access to AVs.
	Aachen	<ul style="list-style-type: none"> 1 BMW i3, 2 vehicles - retrofitted for ADF / V2V testing. 2 e.GO Movers 	Peri-urban Campus.
Sweden	Linköping	<ul style="list-style-type: none"> 1 Navya Autonomous DL4 (Shuttle) 1 EasyMile EZ10 gen 2 (Shuttle) 1 tbd 	Urban Campus area (the red area at the top) and a residential area (bottom right red area).
	Kista	<ul style="list-style-type: none"> 1 t-engineering CM7 2 state of the art AV (Shuttle) 	An urban area with mainly office buildings.
Finland	Tampere	<ul style="list-style-type: none"> 2-3 Sensible 4 (Shuttle buses) 2-3 Pods (alternatively all vehicles may be shuttles) 	The new automated light rail between Hervanta suburb and TAYS University Hospital Campus area will be connected with automated buses.
Denmark	Copenhagen	<ul style="list-style-type: none"> 3 brand tbd (Shuttles) 2 brand tbd (City mid-sized Buses) 	The test area is at Lautrupgaard site, in Ballerup.
Italy	Turin	<ul style="list-style-type: none"> 1 AV Shuttle - NAVYA DL4 1 retrofitted tele-operated car (still to be defined, provided by the Municipality of Turin) 	The demonstration will take place in the City of Turin at the Health and Science area.

Demonstration Sites: Vehicles & Environments

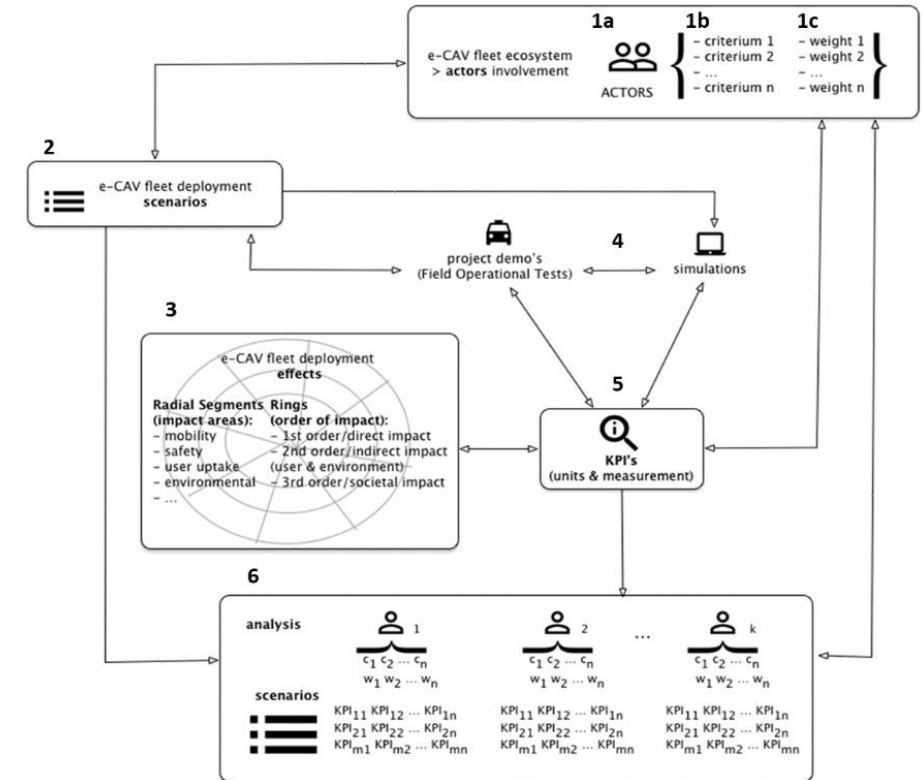
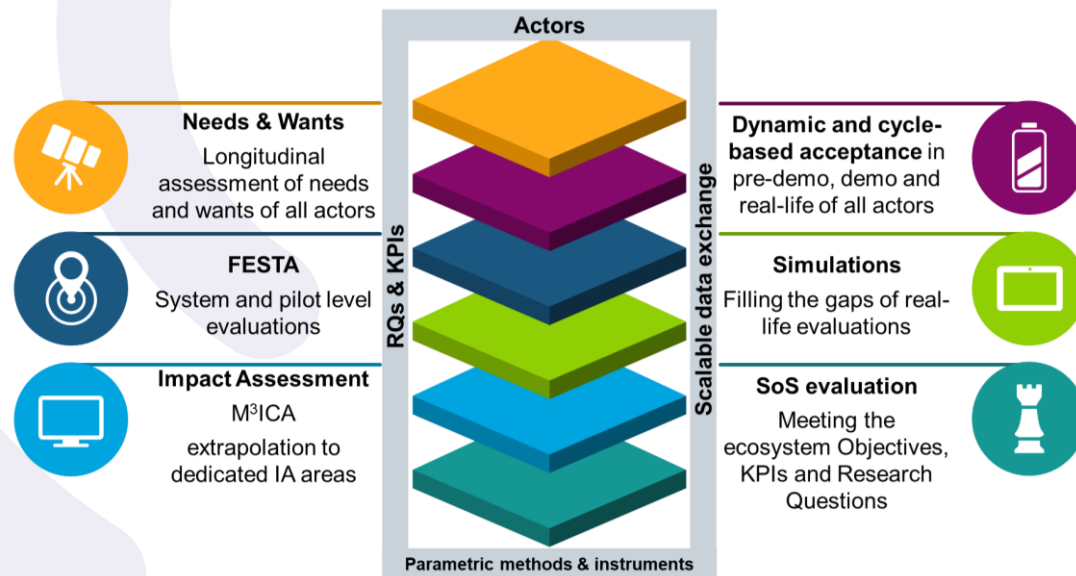


Megasite/ satellite	City	Vehicles	Environment
Greece	Trikala	<ul style="list-style-type: none">• 2 AMANI Swiss Cyprus Limited (iDriverPlus, Zhongtong Bus)• 1 FURBOT cargo vehicle UNIGENOVA• 2 BMW i3 (Passenger cars – Platooning)	Trikala site is 330 km from Athens and includes both a suburban and an urban part. The same site as in City Mobile 2 will be used.
Netherland	Eindhoven	<ul style="list-style-type: none">• 1 tbd (E-Bus)• 3 Renault Scenic (Passenger cars)	Urban area. A part of the city that is one of the front-runner cities for C-ITS deployment.
Czechia	Brno	<ul style="list-style-type: none">• 1 EasyMile (Shuttle)• 1 tbd (Shuttle)• 1 Hyundai i40 Retrofitted (Robo-Taxi)	Urban area. The setting from the former project C-ROADS CZ will be partly used.

SHOW Evaluation Framework



- ✓ The framework encompasses several layers, that to some degree are overlapping or integrated.
- ✓ It starts with the **investigation of the expectations of travellers and stakeholders** (layer 1) and are completed with the **final evaluation of the ecosystem** (Real-life demonstrations) the **impact assessments** and the **simulations** conducted within the project.



The pre and real-life demonstration evaluation framework.

SHOW Twinning Activities and Initiatives



- ❑ Provisional twinning activities with initiatives outside Europe have been anticipated in SHOW (to be validated under the EC guidance) – LoS from **11 entities**
- ❑ Aiming to:
 - To exchange know-how, lessons learned and best practices;
 - To support, if possible and applicable, the interface of architectures, accommodating as much as possible the fulfilment of the a minimum set of Key Performance Indicators (KPIs)
 - To select and exchange specific sets of data sets deriving from the demonstrations that will be mutually agreed
- ❑ Commitment to explore the possibilities to establish a twinning relationship with a relevant project funded by the US Department of Transportation (USDOT)

Planned Twinning

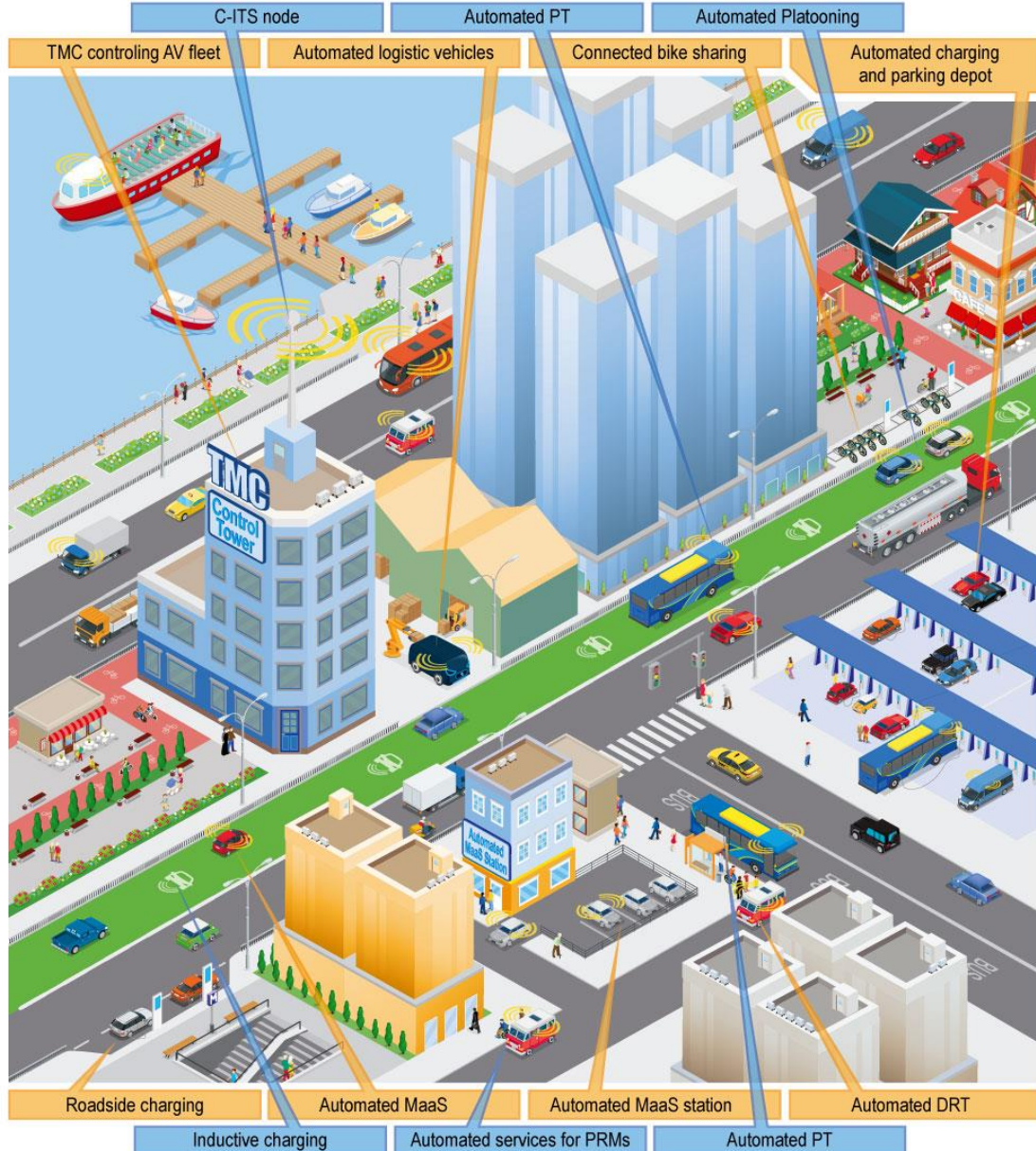
Texas A&M Transportation Institute (TTI)	US
Iteris, Inc.	US
Contral Costa Transportation Authority	US
China Automotive Technology and Research Center Co., Ltd.	China
The Australian Road Research Board (ARRB)	Australia
Curtin University in Perth	Australia
Roads Australia	Australia
TUMCREATE	Singapore
Centre for Excellence for Testing and Research of Autonomous Vehicles - NTU	Singapore
Advanced Public Transportation Research Center, National Taiwan University	Taiwan
Korea Institute of Science and Technology Europe	South Korea (European Dpt)

SHOW Twinning Activities and Initiatives



Entities	Status	Level of cooperation agreed
US DOT	Over Patrick Mercier-Hadisyde (EC)	In progress
ITS Japan & University of Tokyo	Webconference on 09.09.2020 NDA in progress Invited to 1 st Pan-European Workshop	To be defined
SMG (Korea)	NDA in progress	To be defined
The George Institute for Global Health (Australia)	Contact over Anna Anund (12.08.2020) NDA signed 31.08.2020. Webconference on 07.09.2020 Invited to 1 st Pan-European Workshop	To be defined

showcasing the Automated City of Tomorrow



Thank you for your attention!



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