

Autonomous Transport Systems @ Transdev

MOVE



OPERATOR AND GLOBAL INTEGRATOR OF DAILY MOBILITY

- 11 million passenger trips every day
- 18 countries
- 85,000 employees
- 7.4 bn net revenue
- 17 modes of transportation + services as e.g. Mobility Companions & MaaS



Tramway & Tram-train



Passenger Rail



BRT



Metro



Ferry



Car-sharing



Bike sharing



Park & Ride



On Demand Shuttles



Bus

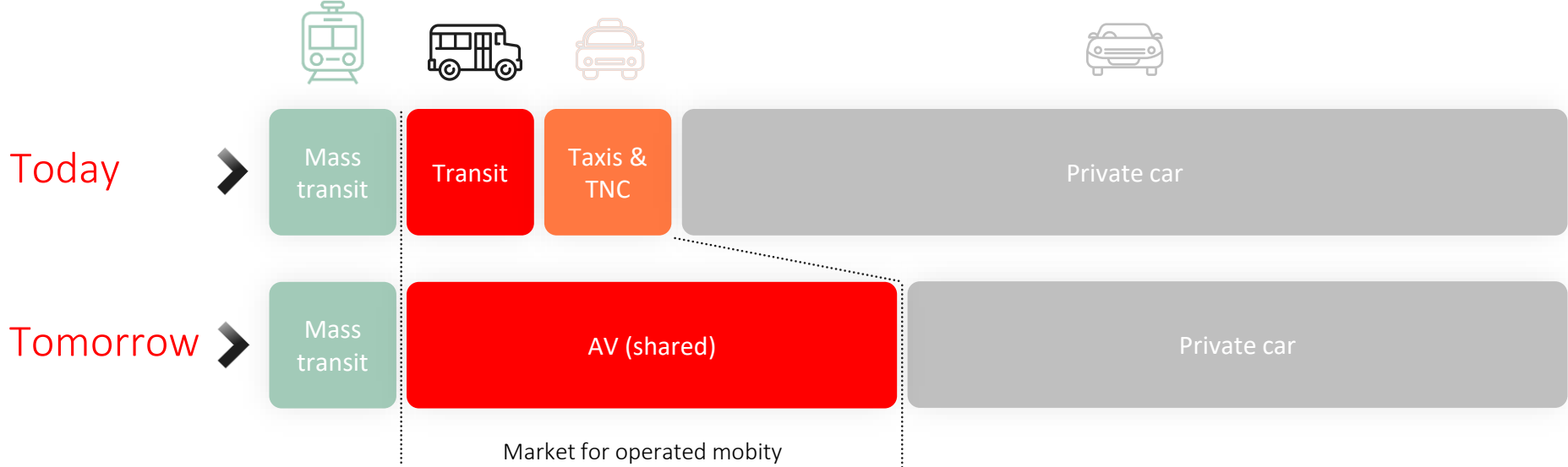


Coach



Paratransit & Ambulance services

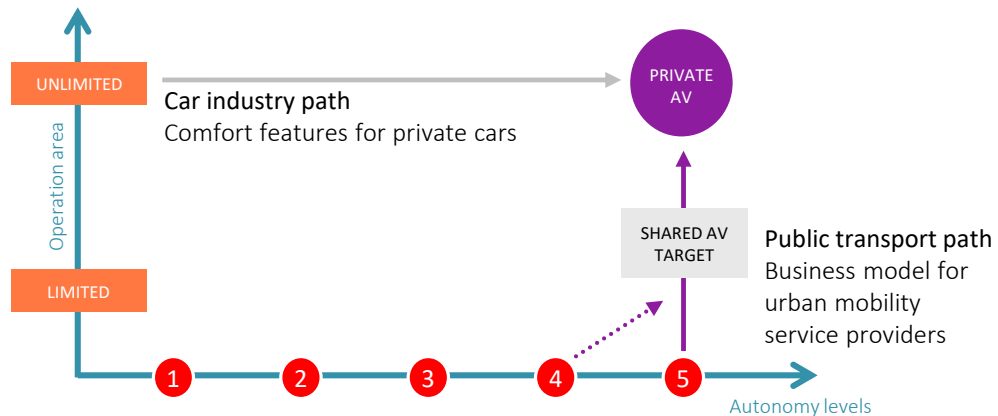
The market of operated mobility services will boom



Our market share is threatened by tech companies and OEMs
The market share of operated shared AV will increase dramatically: **we have a huge opportunity**

Public Transport will be among the first for AV

Public transport offers the quickest development path to full autonomy because it can start operating in a limited area



Business with shared vehicles will be possible before private vehicles
Technically easier:

- Low speed (<70 kph)
- Limited geographical area
- Controlled and pre-registered path
- Human-in-the-loop is possible

Business model more accessible for shared cars:

- The cost of AD is shared between users
- In the case of public transport, AD replaces the driver

Client acceptance

- Our clients already delegate the driving activity to the chauffeurs

With ATS, Transdev is the leader in AV operation with 3.5m+ pax transported without steering wheel / pedals and multiple partners

Over 50 deployments with several manufacturers and partners such as



... and a lot more

ATS Experimentations

50+ AV experimentations

<p>Since 2005 Rotterdam (NL) – World's 1st commercial contract (ferrying passengers between a metro station and business center)</p> <p>2016-2018 Civaux (FR) – World's 1st private commercial contract (shuttling staff across the site of an EDF nuclear power station)</p> <p>Since 2017 Rouen (FR) – 1st on-demand transport service using AV on the open-road in Europe</p> <p>2018 Reims (FR) (facilitating travel between 2 transport modes) Verdun (FR) 1st transport service in France on the open-road in a city center for 2 months) Jacksonville (US) (shuttling sport fans from car park to stadium)</p> <p>Since 2019 Satory (FR) Ongoing open-road trial run for an autonomous shuttle service over ~2km</p>	<p>2014-2015 La Rochelle (FR) – 1st major project in France (City center transport for residents)</p> <p>2017 Issy-les-Moulineaux (FR) (shuttling passengers between park and tram station) Rungis (FR) – 1st commercial contract on open road in France (carrying staff from Icade Rungis park to various restaurants)</p> <p>Since 2017 Paris-Saclay (FR) – 3-year projects on open-road</p> <p>Since 2018 Gainesville (US) (shuttling students from city center to college campus) Babcock Ranch (US) Operations in a private gated area</p>
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- Experiments using external providers solutions/ short term demos
- Long term R&D experiments using internal solutions (e.g. i-Cristal, internal supervision system)

Rouen Normandy Autonomous Lab



- ~10km road at a max. speed of 40km/h; ~8K km done in autonomous mode as of July 2019
- Project leveraging ATS assets, notably supervision, infrastructure or dispatch systems
- Current operations using 4 Renault Zoe
- Bus Line service with i-Cristal expected in 2021

Paris-Saclay Autonomous Lab



- Service currently tested
- ~3km trip on a dedicated lane at night (shared with traditional PTs)
- Project fully operated by ATS on i-Cristal shuttles (other section operated by Renault with Zoe)
- Ambition to test operations without safety driver

Two on-going projects with strong public transit use-cases

Rouen Normandy Autonomous Lab (RNAL): A technical challenge on open roads



10 km

On open roads with
17 stops



3

Autonomous round circuits



40 km/h

Max. speed



27 km/h

Average operating speed



20

Sites equipped with
intelligent connected
infrastructures



Millions

of data collected and
processed at each output



**Supervision
from distance**

integrated into the public
transit system



**App-based
reservation system**

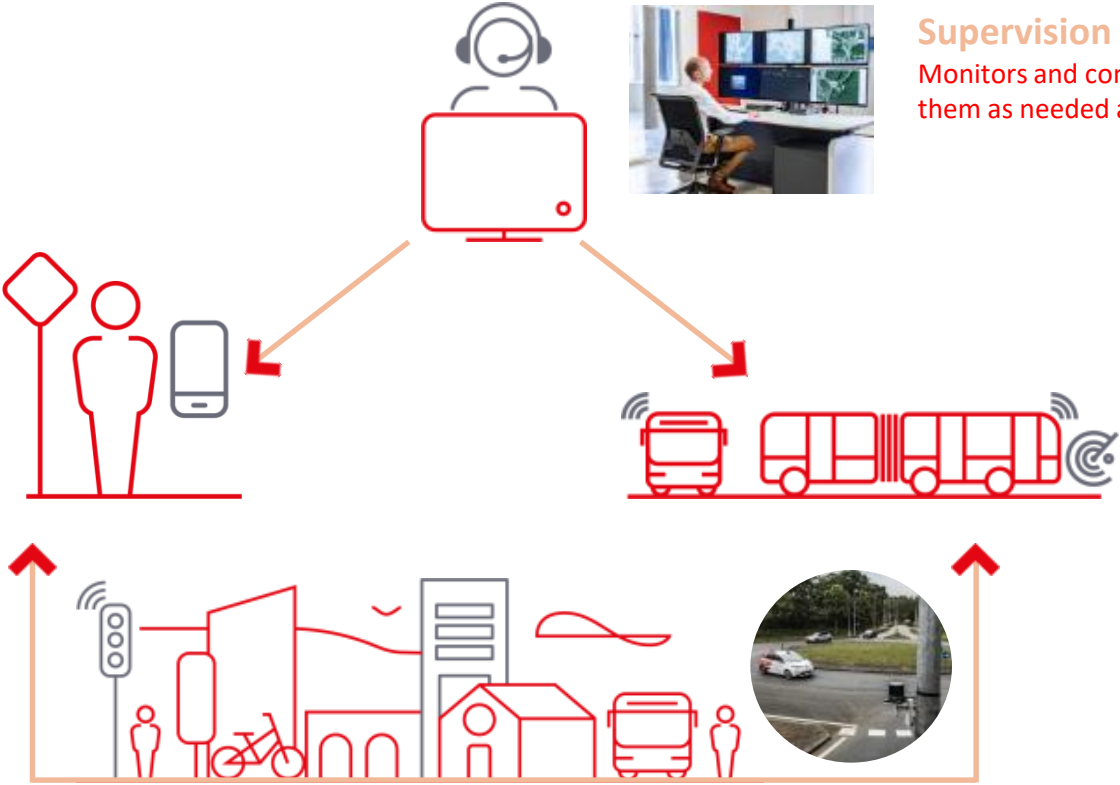
incl. fleet dispatching

Supervision and connected infrastructure ensure safe operations



Client app

Informs and accompanies travellers before, during and after their journey



Connected infrastructure

Collects and transmits information of the environment



Supervision

Monitors and controls the fleet of vehicles by dispatching them as needed and staying in direct contact



Integrated intelligence

Locates and analyzes the environment in real time to move safely; ensures safe operation of the service

Zoom on i-Cristal

Designed to match Public Transport needs

- Accessible to reduced mobility people including wheelchairs
- Platform compliant with French and European Public Transport regulations
- Complementary to modes of mass transport (metros, tramways and buses)

Autonomous driving platform for Public Transport deployment

- Redundant steering & braking system
- Safe communication module and Safe-Stop in the lane module
- State of the art HMI with passengers and road-users
- Ready to integrate an AD system

Technical information

- Capacity: 16 passengers
- Slope: 12%
- Full charging time: 90 min (50% in 30min) for a 100km range
- USB charger on-board
- Height suitable with standard container



THANK YOU

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Henrik Behrens



transportation
technology
by transdev