Breakout Session #20: "Making Automation Work for Cities"

Aims:
• Discuss **status of automation** in cities in the US and Europe – from a **city perspective**.
• Identify key elements of an "**automation ready**" **framework** that helps to meet urban policy goals.

Recommendations
1. Make sure you have clear, widely supported **policy goals** – and expected **CAV contributions**.
2. Create a **strong multi-stakeholder partnership** (private-public, public-public, between departments, state/national support?).
4. Manage (complex/ contradictory) **citizen expectations**. Communicate "It is innovation".
5. Keep an eye on the **business case**.
Breakout Session #20: "Making Automation Work for Cities"

Recommendations

6. Think about **impact assessment** "from day 1"
7. Identify clear **performance measures** for automated services/providers (local KPIs).
8. Clarify expectations on **users' cross-brand experiences** (or a uniform local brand?).
9. Involve **other municipal services** (e.g. waste collection, street cleaning, snow plowing)
10. **Space management** is a key future challenge (on-street/off-street)
11. Ensure automation is part of an **innovation cycle** (incl. learning).
12. Synchronize **technology and policy transition**: the new mobility paradigm in your city.
13. Consider the wider **transition landscape** (MaaS, digital infrastructure, energy, etc) and how supporting ecosystems can contribute (e.g. planning, labour relations, procurement)
14. Engage in **learning and exchange** activities, including international dialogue.
Thanks to the co-organisers, note takers!

- Jane Lappin – Toyota Research Institute
- Scott Smith – US DoT / Volpe Center
- Dirk Heinrichs – Institute of Transport Research - German Aerospace Center (DLR)
- Ellen Partridge, Environmental Law & Policy Center
- Amitai Bin-Nun – Securing America’s Future Energy (SAFE)
- Bryan K. Pounds, MassDOT, Office of Transportation Planning
- Karen Vancluysen – Polis
New Mobility in SF
AV Symposium 2017

Tilly Chang, Executive Director
San Francisco County Transportation Authority
Demand is booming,
Demand for Walkable, Transit-Oriented Streets
Technology-Enabled, Clean Transportation > Rewards/Pricing, (Shared) Mobility as a Service
New Mobility Policy Framework and Research Underway, Opportunity for Pilots

- Ten Guiding Principles:
  - Safety
  - Transit
  - Equitable Access
  - Disabled Access
  - Sustainability
  - Congestion
  - Accountability
  - Labor
  - Financial Impact
  - Collaboration

Daily TNC Trips by TAZ
THANK YOU

Questions?
Welcome to Breakout Session 20: "Making Automation Work for Cities"
Introduction

- What cities hope and fear of automation
- What cities do in automation
  - conducting automation pilots to meet key urban policy goals
  - creating enabling policy frameworks for transport automation
  - cooperating internationally?
- Speakers from cities, transit authorities and other urban stakeholders from Europe and the US
  - Boston, Helmond, Milton Keynes, San Francisco County
  - Waste Management Inc
  - Volpe Center, Austriatech
  - POLIS, NACTO
  - US-EU Twin Projects
Thanks to co-organisers!

- Jane Lappin – Toyota Research Institute
- Steve Buckley – WSP Parsons Brinckerhoff
- Scott Smith – US DoT / Volpe Center (also note taking)
- Ellen Partridge, Environmental Law & Policy Center
- Bryan K. Pounds, MassDOT, Office of Transportation Planning
- Amitai Bin-Nun – Securing America’s Future Energy (SAFE)
- Dirk Heinrichs – Institute of Transport Research - German Aerospace Center (DLR)
- Karen Vancluysen – Polis
Agenda

- City presentations
- Break (~ 3:30 PM)
- Expectations of automation
- Panel discussion (What can cities do to make automation work for them?)

Q & A after each presentation
CoEXist

Automation-ready transport models and road infrastructure for the coexistence of automated and conventional vehicles

Siegfried Rupprecht, Rupprecht Consult – Forschung & Beratung GmbH, Cologne/ Germany
Project Details

- **Funding Programme:** Horizon 2020 (Europe’s Research and Innovation Programme)
- **Duration:** May 2017 – April 2020
- **Total Budget:** 3.5 m€ (~4 million US $)
- **Strategic Aim:** To bridge the gap between connected and automated vehicle (CAV) technology and transportation and infrastructure planning by strengthening the capacities of urban road authorities and cities to plan for the integration of AVs on the same network.
- **16 partners** from 7 European countries (technology providers, automotive industry, academia, European associations, city road authorities).
Facilitate step-wise CAV introduction

Take-up, exploitation and dissemination

Automation-ready road authorities

Automation-ready infrastructure

Automation-ready transport models

Automation-ready framework
CoEXist Analysis – Modelling - Simulation (AMS) Framework

- **Simulation** (Renault, Vedecom, TASS International, PTV)
  - Create closed-loop connection between Renault & Vedecom CAV control logic with PreScan AV simulator and Vissim traffic flow simulator to extract *behavioural parameters of CAV applications*.

- **Modelling** (PTV and University of Stuttgart)
  - CAV-ready *microscopic* traffic model – PTV Vissim
  - CAV-ready *macroscopic* transport model – PTV Visum

- **Analysis** (VTI – Swedish Road Research Authority)
  - Based on model results develop impact assessment metrics for traffic performance, infrastructure space efficiency and road safety for the CAV context

- **Demonstration** of CoEXist AMS
  - Demonstration in *four European road authorities* (Gothenburg - Sweden, Helmond – The Netherlands, Stuttgart - Germany and Milton Keynes – UK ) with different urban structures and traffic compositions.
WP1 - CoEXist "Automation-Ready" Framework

- **Policy context** of cities
- **Technology** options
- Understanding the **impacts**
- Identify **policy stages**
- "Automation-Ready" **measure portfolio**
  - Transport planning
  - Transport infrastructure
  - Organisational structures, knowledge
- **Recommendations**
  - Review existing transport strategies
  - "Automation-Ready" Action Plan
WP2 CoEXist – AMS tools – Vissim and PreScan
WP4
Use Cases

Overview of CAV-ready road infrastructure adjustments

Transition period
Scope of CoExist

Use cases

1. Mixed use road space, Gothenburg
2. Accessibility during long-term construction, Gothenburg
3. Signalised traffic junction, Helmond
4. Highway and interurban zones, Helmond
5. Waiting and drop-off area, Milton Keynes
6. AV deliveries and freight, Milton Keynes
7. Road capacity, Stuttgart
8. Driverless cars, Stuttgart
CoEXist and FHWA Project Twinning

- European Commission – US DoT Transportation Research Project Twinning Initiative

  - "Twinning is the coordination of research activities in funded research projects of mutual interest, and the collaboration that occurs during the conduct of this research, on the basis of mutual benefit."
  - Regular interaction between project teams, incl. face-to-face meetings, at least once per year to exchange information
  - Formal "Twinning Agreement" and Joint Annual/ Final Reports
  - Flexibility in defining the scope and depth of cooperation
Aims of cooperation

To exchange information and collaborate

- define analysis, modelling and simulation (AMS) tools that incorporate features of connected and automated vehicles (CAV) adequately
- apply AMS tools to several real world use cases
- study CAV impacts (use cases)
- develop guidance for deployment
Strategic aims of cooperation

- To coordinate the definition of a common representation of connected, automated vehicles (CAV) in traffic simulation models.

- To help create more robust modelling products that produce compatible, and more widely validated outputs (in traffic flow micro-simulation and CAV impact assessment).
Status

- **Twinning Agreement** in preparation
- **Outreach** activities planned
Thank you very much for your attention.

Siegfried Rupprecht

Rupprecht Consult – Forschung & Beratung GmbH
Clever Str. 13 – 15, 50668 Köln (Cologne), Germany
Tel +49 221 60 60 55 - 11
s.rupprecht@rupprecht-consult.eu

www.rupprecht-consult.eu
www.mobility-academy.eu
Impact Assessment for AV Systems

Scott Smith, Volpe Center, US DOT
Are AVs a good thing in your city, or not?

It depends! ...on the following:
• What do we mean by AV?
• What impacts do we care about?
• What are the key uncertainties?
• How will the uncertainties affect the impacts?
What do we mean by AV?

Purpose
• Person travel (residents, visitors, persons with disabilities, etc.)
• Freight (type and size of shipments)

Service type
• Short haul / long haul
• Individual / group
• Fixed route, non-fixed route
• Specialized (e.g., valet parking)

Vehicle ownership
• Privately owned single vehicle vs. fleet

Vehicle type
• Lightweight vehicle (e.g., golf cart)
• Automobile / pod
• Bus
• Truck

SAE level of automation
Available automated driving functions
Operational design domain (ODD)
• Exclusive AV vs. mixed environment
• Type of road (limited access, arterial, local)
• Mapping infrastructure
• V2V, V2I, V2P communications infrastructure
• Road surface and markings
• Environment (lighting, weather)
Impacts
Direct Impacts

- Can be measured in field operational tests
- Can be scaled up to a national level
- Will lead to indirect impacts
- Provide a foundation for assessing the indirect impacts that are of interest to society

Examples

- Response of drivers and other road users
- Vehicle operations
  - Acceleration
  - Car following
  - Gap acceptance
- Safety
- Energy / Emissions
- Personal Mobility
- Cost
- Infrastructure Needs and Operational Design Domain
Indirect Impacts

**Examples**
- Network efficiency
- Travel behavior
- Infrastructure
- Public health
- Land use
- Socio-economic

**Infrastructure Impacts**
- What happens to transit?
- Highway capacity
- Demand (highway, transit)
- Size and weight
- Type of infrastructure
- Implications for revenue and funding
  - Road, transit
Areas of Uncertainty

Technology

Future of AVs and their use

Policy

User Response
Thank you

Sponsorship: US DOT Intelligent Transportation Systems Joint Program Office (ITS JPO)

www.its.dot.gov

Project Manager: Scott Smith
US DOT / Volpe Center
Scott.Smith@dot.gov
+1-617-494-2588

Program Manager: Kevin Dopart
US DOT / ITS JPO
Kevin.Dopart@dot.gov
+1-202-366-5004
Thanks to the co-organisers, note takers!

- Jane Lappin – Toyota Research Institute
- Scott Smith – US DoT / Volpe Center
- Dirk Heinrichs – Institute of Transport Research - German Aerospace Center (DLR)
- Ellen Partridge, Environmental Law & Policy Center
- Amitai Bin-Nun – Securing America’s Future Energy (SAFE)
- Bryan K. Pounds, MassDOT, Office of Transportation Planning
- Karen Vancluysen – Polis
Breakout Session #20: "Making Automation Work for Cities"

Recommendations

6. Think about **impact assessment** "from day 1"
7. Identify clear **performance measures** for automated services/providers (local KPIs).
8. Clarify expectations on users' **cross-brand experiences** (or a uniform local brand?).
9. Involve **other municipal services** (e.g. waste collection, street cleaning, snow plowing)
10. **Space management** is a key future challenge (on-street/ off-street)
11. Ensure automation is part of an **innovation cycle** (incl. learning).
12. Synchronize **technology and policy transition**: the new mobility paradigm in your city.
13. Consider the wider **transition landscape** (MaaS, digital infrastructure, energy, etc) and how supporting ecosystems can contribute (e.g. planning, labour relations, procurement)
14. Engage in **learning and exchange** activities, including international dialogue.
Envisioning a Great Cities with AV Technology
Major shift in US cities: Singular goal of vehicular movement is giving way...
... to streets that serve many purposes.
AVs carry many promises. ...what does the path look like?

- Reduce traffic violence?
- Decrease carbon footprint?
- Free up public space?
- Decrease travel costs?
- Decrease vehicle ownership?
- Decrease congestion?
Do “driverless” cars mean a people-less city?
NACTO supports automated vehicle policies and regulations designed to:

» promote safety for all street users
» Reduce environmental impacts of vehicle travel
» Support the future vision of cites as great places to live, work, and play
» Rebalance the right-of-way
» Support public transit
» Improve mobility for all

www.nacto.org/policy
Making Automated Vehicles Work for Cities

1. Improving Safety
2. Sharing Data
3. Expanding Transit
4. Democratizing the Curb
1. Improving Safety
1. Improving Safety
1. Improving Safety
Manage Streets in Real Time
3. Expanding Transit
3. Expanding Transit

Focus on Fixed
3. Expanding Transit

Flexible Route
3. Expanding Transit

Point to Point
4. Democratizing the Curb
4. Democratizing the Curb
Making Automated Vehicles Work for Cities

1. Improving Safety
2. Sharing Data
3. Expanding Transit
4. Democratizing the Curb

mollie@nacto.org
Breakout Session #20: "Making Automation Work for Cities"

Aims:
• Discuss status of automation in cities in the US and Europe – from a city perspective.
• Identify key elements of an "automation ready" framework that helps to meet urban policy goals.

Recommendations
1. Make sure you have clear, widely supported policy goals – and expected CAV contributions.
2. Create a strong multi-stakeholder partnership (private-public, public-public, between departments, state/national support?).
4. Manage (complex/contradictory) citizen expectations. Communicate "It is innovation".
5. Keep an eye on the business case.