Automated driving in Finland
Automated driving in Finland
Pilots & developments
E-Services

All Trafi e-Services conveniently in one place.
Testing of automated vehicles

- Testing of all automated vehicles (SAE levels 0–5) is possible on public roads in Finland using a test plate certificate
- Vehicle under testing must have a driver either inside or outside the vehicle
- Focus on responsible behaviour of the testing organisation
How? Test plate certificates

- Valid for one year at a time
- Eligible applicants: companies, agencies or other R&D organisations
- Entitles the bearer to drive test vehicles, to a limited extent and on a temporary basis, both in road traffic and off-road
- For testing in road traffic, Trafi will issue test plates
Requirements for test permits

- *Trade register extract* from the company’s country of incorporation
- *Trial plan* including:
  - a general description of the trials
  - technical specifications of the test vehicles
  - information on the road area where the trials are intended to be conducted
  - proof of insurance cover for third party liability
- *description of how road safety will be ensured*
Follow-up: reporting

The test plate certificate holder must **submit a report** to Trafi on the trial results.

The report should describe:
- how the trial plan was implemented
- what kind of **deviations** from the plan were encountered
National strategy for transport automation

- All modes of transport
  - Air
  - Maritime
  - Rail
  - Road

- Robots on land, in water and in the air – Promoting intelligent automation in transport services; Publications of the Ministry of Transport and Communications 7/2015
  - “If it works in Finland, it will work anywhere!”
  - Simpler, smarter regulation in focus

- A governmental resolution on robotisation in May 2016
National AV activities in Finland

1. Winter testing in Northern Finland
   - Arctic Challenge pilots
   - Aurora E8-highway: intelligent infrastructure testing environment

2. Urban testing facilities
   - Tampere
   - Developing testing tools & requirements for AVs

3. Automated electric buses/shuttles
   - Helsinki, Espoo, Tampere
   - Automated last-mile solutions & innovation platform
Sohjoa automated electric buses

- 2 EasyMile buses (SAE Level 4)
- Public streets
- Traffic lights, street markings
- Signs indicating AV testing

Helsinki  Espoo  Tampere

Finnish Transport Safety Agency
Challenges & lessons learned

- Close and interactive cooperation between authorities and testing organisations is crucial already in the planning phase
  - In urban settings, city transport planners should be involved as early as possible
  - Including police in the discussions from the start
- Real urban environments are always more complicated to test in than expected
  - Illegal parking issues, lots of pedestrians and cyclists
- For automated electric buses, conditions are still a limiting factor
Automated remotely operated bus technology

Developing software platform for remote control of robot buses
Using 5G network as an enabler technology
Real-time sensor data
AI assisted human-machine communication
Development of a remote control room
Exploring how autonomous vehicles could be fitted to existing mobility ecosystem
Evaluating future business potential
Assessing the user experience of both passengers and remote operators
Driverless bus line coming to Helsinki this fall

With the RoboBusLine, autonomous transit will go from experiment to regular scheduled service

BY PATRICK SISON | JUN 15, 2017, 1:22PM EDT
UrbanAutoTest – testbed for connected and automated driving

- Develop urban test areas for C-ITS (public roads in Tampere)
- Based on existing industrial standards
- Test track includes tunnels and parking halls
AUTOnated driving Progressed by the Internet Of Things

Use IoT technologies to move Automated Driving towards a new dimension

- Enhance driving environment perception with “IoT enabled” sensors
- Integrate IoT platforms in the vehicles
- Use Cloud and IoT platforms to
  - Share IoT sensor data
  - Create new Mobility Services with fully automated vehicles
AUTOPILOT test sites

- **Brainport, NL**
  - Automated Valet Parking
  - Highway pilot
  - Platooning

- **Tampere, FI**
  - Automated Valet Parking
  - Urban Driving

- **Versailles, FR**
  - Automated Valet Parking
  - Urban Driving
  - Platooning

- **Daejeon, KR**
  - Urban Driving

- **Vigo, SP**
  - Urban Driving
  - Automated Valet Parking

- **Livorno, IT**
  - Urban Driving
  - Highway pilot
• **Intersection support**: use of traffic cameras to detect VRUs in conflict with turning pedestrians

• **Automated Valet Parking**: assistance and control of unmanned vehicle during parking
Hybrid C-ITS corridor

- Day 1 Safety Related Traffic Information with support of Day 1.5 and beyond services
- Interoperability demonstrated in 2017
- Ecosystem for the data value chain and stakeholders

Co-financed by the European Union
Connecting Europe Facility
✓ NordicWay Intechange Node hybrid communication Safety Related Traffic Information demonstrated successfully in 10 May 2017 between SWE-NOR and SWE-DNK borders. Youtube links: short and long video from the demonstration

✓ NordicWay final results, including technical performance, user behavior and acceptance as well as socio-economic analysis is published in the final event at 21 November in Brussels (INEA)

✓ Architecture available at www.nordicway.net

Co-financed by the European Union
Connecting Europe Facility
Arctic Challenge 2017-2019

- Pilot project examining opportunities in road transport automation and intelligent infrastructure and their performance in snowy and icy conditions
- Trafi and FTA research funding €1–2 million
- FTA infrastructure funding €2 million
- Based on the Road Transport Automation Road Map and Action Plan 2016–2020
  
  [Link to document]
Arctic Challenge - research questions

• What landmarks, such as delineators and reflective posts, or snow poles and plot access marks, support automated driving? Where should these be located? What should they be like?

• How could the C-ITS Day 1 hybrid services improving traffic flow and safety be implemented?

• How does the remote control and monitoring of vehicles work in 4G and in the first stage of the 5G network in good/poor weather and road conditions?

• In what way and how accurately could a vehicle be positioned to fulfil the needs of automated driving at northern latitudes where no edge markings or roads can be recognised?
Public test section supports connected and automated driving trials in road traffic.

Testers can utilize a 10 km long test section on the main road E8. The physical infrastructure of the test section is equipped to support test activities and extensive information services are available for test use. In addition, a test vehicle can be used for trials done on the move.

- Precise positioning down to 1 - 5 cm accuracy with professional GNSS-receivers.
- 5G test network and extensive mobile network (3G, 4G, LTE 800/1800) in the region.
- HD map of the test section available.
- Data collected from the sensors and the equipment available as open data.

Fibre and electricity available throughout the test section.
Piping and crosspiping allow post-installations to physical infrastructure.
Ready-to-use device cabinets and facilities for testers.
Instrumentation supporting intelligent infrastructure asset management trials.