

INTERNATIONAL ROAD TRANSPORT RESEARCH

FACTSHEET U.S.A.

This series of factsheets highlights main framework conditions as well as goals and significant future trajectories of road transport research (RTR) for China, Korea, Japan, the US and the EU for the next 10 – 15 years. This is an activity of the EU project FUTURE HORIZON.



Strategic Innovation Policy Goals and Programmes

- 2030: Carbon reduction by 50% (cmp. to 2005)
- 2050: Carbon-Neutrality¹
- Alternative Fuel Corridors: e.g. hydrogen, propane charging (DOE)
- End-to-end domestic battery supply chain (7 b\$)² & Next-Gen Batteries

- Bipartisan Law: Hydrogen hubs for production & delivery (9,5 b\$, DOE)²
- NEXTCAR: Automated driving for energy reduction (18 m\$, ARPA-E)
- Energy Storage Grand Challenge³
- IRA: Large investment in energy & climate initiatives (369 b\$)⁴

- 2030: Half of U.S. sales to be zero emission vehicles; no ICE phase-out⁵
- 2035 - 2040: Some federal states like California phase out ICE

- Bipartisan Law: Clean buses/trucks (3.7 b\$) & EV chargers (7,5 b\$)²
- Promotion of PHEVs (e.g. through DOE accelerator programme, 20 m\$)

- Technology-neutrality to allow the industry to find the best solutions⁵

- Connected Vehicle Pilot Program (Phase 3, DOT)

- Become AD market leader & safeguard cybersecurity & ensure privacy⁶

- CARMA: Collaborative driving open source development (FHWA)

- Freedom of choice for consumers (manually/automated driving)⁶

- Chips and Science Act: Funding R&D/production of autom. chips (2 b\$)⁴

- Enhance inclusivity and accessibility, e.g. through automated driving⁶

- Complete Trip Programme: Intermodal transport (40 m\$, ITS JPO)

- Support consumer choice for mobility

- Inclusive Design Challenge: Inclusive automated vehicles (5 m\$, DOT)

- 2045: 100% electric trucks sales in California

- Supertruck 3: i.a. new-energy vehicle development (199 m\$, DOE)

- Automation in logistics shall improve the health of labour⁶

- Oklahoma Advanced Mobility Pilot: Automated Delivery (ODOT)

- Safe System Approach: Speed reg., safe vehicle design and infrastructure

- Exploratory Advanced Research Programme (FHWA)

Road Safety

- Connected Vehicle Pilot Programme: In the NYC-pilot, vehicles connected to road side units and wirelessly with each other test safety issues with pedestrians with/without disabilities (USDOT/NYCDOT)

Voices: Virtual Open Innovation Collaborative Environment for Safety between the state and private sector for innovation in safe AD (DOT)

Research Activities

- 2019: Apply the ARPA-E NEXTCAR AV algorithms to offload computing to road-side infrastructure to save energy
- Research in alternative fuels for heavy duty trucks (e.g. REFUEL projects funded by DOE, 2016)
- Mitigating impacts on grid of 10 millions EVs to be charged in the future (DOE)
- 45% reduction to \$80/kWh manufactured cost for a battery pack by 2030 for a 300-mile range electric vehicle (DOE³)

Energy & Environment

- High-power traction inverters for EVs

Electrification

- Social acceptance studies of PHEVs
- EV-battery recycling and second-use for EV-batteries (60 m\$, EERE, DOE)
- 10 min quick charge cells for 500 miles coverage (SK innovation U.S. research)
- Reduce overall amount of energy use through automated driving (DOE³)

Automation & Connectivity

- Connected Vehicle Pilot Programme (USDOT): Advanced Driver Assistance System tests, collaborative driving with road side units for passenger and heavy duty vehicles in Wyoming, NYC, NY and Tampa, FL addressing environmental and safety (Phase 3 tests finished in 2021)
- Private sector-driven standardisation of automated driving levels and technical requirements through SAE International
- V2V and V2I demonstration with 5G (CARMA, FHWA)

Urban Mobility

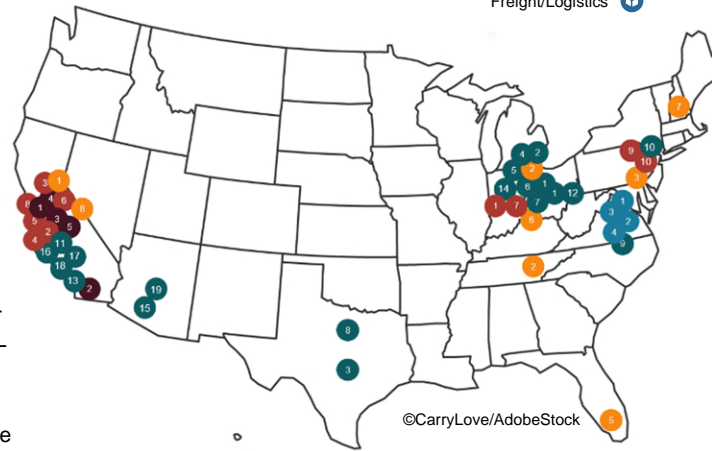
- Explore transfer potentials of AV for duty vehicles and busses for public transit
- Truck platooning demonstrator cooperative adaptive cruise control on Interstate 66, (Exploratory Advanced Research Programme, FHWA)
- R&D on data-driven fleet management for shared micro mobility (Santa Monica, CA)

Freight & Logistics

- Automated delivery with light duty vehicles and drones (ODOT)
- Apply AI and high performance computing to anticipate and reduce congestions
- UDELV: The start-up delivers groceries and goods for Walmart for mid- and last-mile by its automated, modular container pods.
- Apply AI and high performance computing to anticipate and reduce congestions
- 2019: Semi-automated postal trucks service on a 1000 miles route in Texas by the U.S. Postal Service
- Pedestrian & bicyclist communication through headlights projecting signs
- Research for redundancy in mobility systems and definition of systems that accommodate mistakes (Save System Approach)

Main Players

- Electrification ⚡
- Automation & Connectivity 📶
- Freight/Logistics 🚚



Research Institutes

- Stanford University
- Oak Ridge National Laboratory
- MIT
- American Center for mobility
- Freight Mobility Research Institute
- Argonne National Lab
- VOLPE
- UC Davis ITS

Suppliers

- Bosch
- Proterra
- Ridecell
- GATIK
- Embark trucks
- Intel
- Bollinger
- NVIDIA
- Borg Warner
- Panasonic

Mobility Service Providers

- Waymo
- TuSimple
- Ridecell
- Veniam
- Aurora

Innovation Policy

- DOE
- DOT
- ARPA-E
- ITS JPO

Socio-Economic Developments

- Car-centric mobility system
- Strong IT-industry and start-ups as drivers for innovation
- Cost-intensive, usually governmental tasks like provision of charging infrastructure are carried out in some cases by the private sector
- Shortage of about 60.000 drivers in the logistic sector

OEMs

- Ford
- GMC
- Tesla
- Chevrolet
- Chrysler
- Buick
- Jeep
- Toyota
- VW
- BMW

Start-up OEMs

- Zoox
- Lordstown
- Canoo
- Optimal-EV
- Local Motors
- Next Future
- Nuro
- UDELV
- Nikola

Impacts of COVID-19

- United Auto Union and the three Detroit OEMs neglected bailouts
- 2 b\$ grants for transport providers during COVID-19 pandemic due to low occupancy rate
- Automated delivery start-up like Nuro gained market share for delivery of pharmaceuticals and medical goods

Conclusions

Automated driving research funding is a high priority across governmental departments due to its potential for road safety, insurance, availability and health of workforce, energy savings, military and farming. Due to challenges to provide mobile data coverage in some regions in the US, vehicles need to apply most of the decision-making capabilities in-vehicle, though some projects aim to strengthen V2I. In most cases, the government does not set specific, timely goals for the industry, since the US aims at fostering market-driven innovation.

The US still focuses both research on ICEs and electric mobility. Regional solutions, pilots and legal „patchwork“ for automated or electric mobility hinder nationwide scale-up. Activities of new initiatives and offices, like the Joint Office of Energy and Transport or ARPA-E and the upcoming APRA-C could possibly foster research and development to use synergies of automation and electrification.

References

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