

Opportunities of Automated Driving

The Darmstadt View on AD



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Special thanks to all research associates of FZD.

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The two views



Opportunities from an overall societal perspective

- Economic offer of public transport in non-frequent zones and times
- Less raw materials in the circular economy
- Safeguarding the current mobility offer and transport system
- Smooth traffic with lower energy demand and less congestion
- More open spaces in city centers
- Fewer accidents thanks to "man & machine" team approach
- Technological advancement and assertion in international competition

Opportunities for the individual citizen

- Relaxed and safe travel with usable time shares
- Self-determined mobility with one's own vehicle up to elder age and also in case of physical impairment
- Reduction of physically demanding work for truck and bus drivers, especially in long-distance traffic

The opportunities from an overall societal perspective

Economic offer of public transport in non-frequent zones and times



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The goal is to complement, not displace, public transportation by automated shuttles, which...

- will be more favorable in terms of total cost of ownership (TCO) as well as environmental impact than manually driven buses in times of shortage of skilled workers,
- connect rural areas to existing commuter railroads and thus avoid CO₂-intensive construction of new lines.

Temporal perspective:

- After 2030, driving without safety drivers on rural roads is technically feasible, but requires incentive systems for municipal operators.



Image: UNICARagil

The opportunities from an overall societal perspective

Less raw materials in the circular economy



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The goal is to reduce the number of low-utilized passenger cars, which tie up scarce raw materials for years which are then not available to the circular economy, through

- Mobility-as-a-service offerings (aka robotaxis), which
 - are sufficiently utilized through automation (elimination of manual empty runs) and
 - could be offered at lower prices than today's cabs in the medium term.

Temporal perspective:

- Automated driving could become technically possible in the city after 2035 without safety drivers, given appropriate R&D efforts and harmonized regulation. However, relevance will only arise with a true circular economy, especially in the area of HV batteries.



Source: pexels

The opportunities from an overall societal perspective

Safeguarding today's mobility supply and transportation system



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The aim is to maintain a broad range of mobility services and efficient supply chains despite a shortage of skilled workers/drivers¹ by the

- automation of trucks in long-distance transport and
- bus and cab automation in countries with strong demographic change (e.g. Japan).

Temporal perspective:

- Truck L4 systems are in development² and expected to hit US highways within this decade focusing on major routes in southern states connecting those hubs which are close enough to highways.



Image: © Daimler Truck AG

The opportunities from an overall societal perspective

Smooth traffic with lower energy demand and less congestion



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The aim is to increase the throughput of vehicles locally and temporarily in the event of bottlenecks due to

- anticipatory and cooperative behavior,
- digital coupling of automated vehicles for closer safe distance and consistent speeds.

Temporal perspective:

- For USA and EU not earlier than 2040, this vision seems conceivable, since a significant proportion of vehicles with automation will be required, which will also have to be specially designed for this purpose (today's assistance systems such as Adaptive Cruise Control do not have a traffic-calming effect per se).¹



Image: Pixabay

The opportunities from an overall societal perspective

More open spaces in city centers



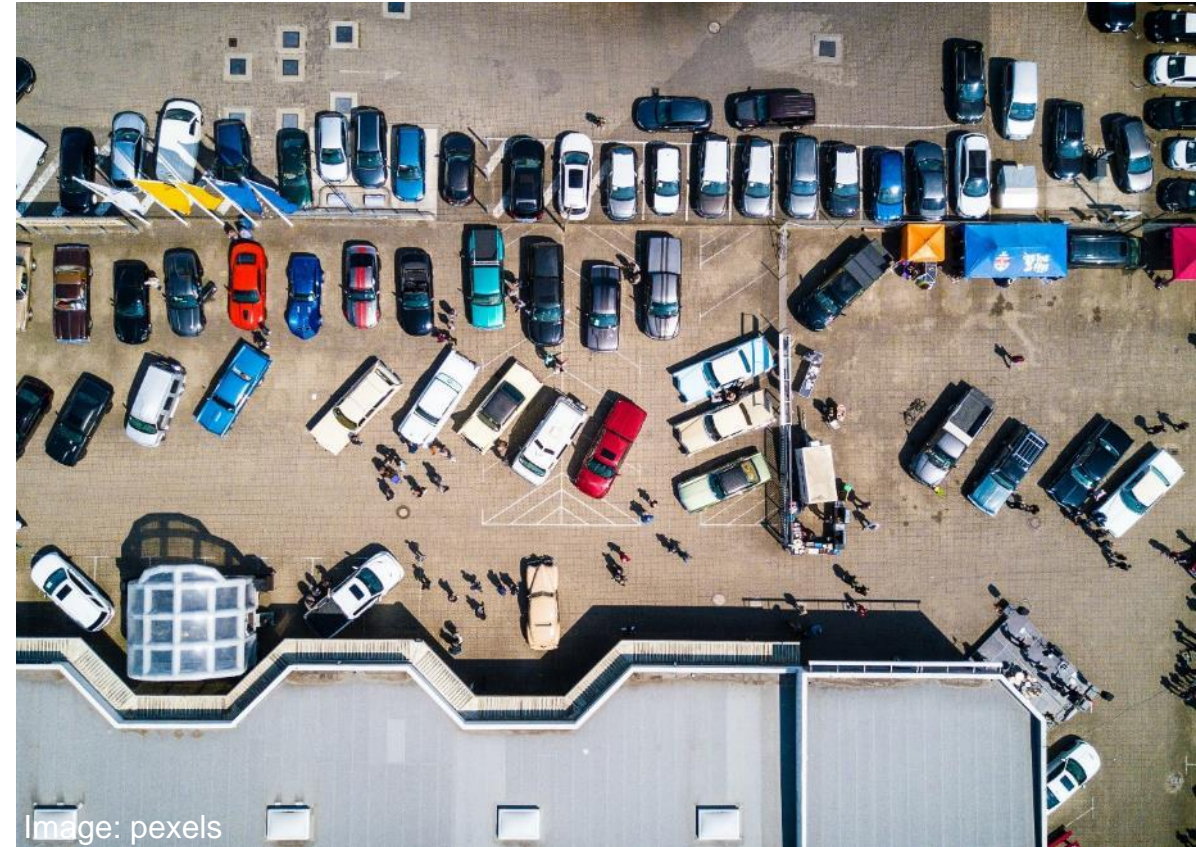
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The goal is to create designable open spaces in city centers when

- visitors and residents can park their remaining vehicles on the outer areas of the city and use automated shuttles to travel to the city center, which does not have to provide any parking spaces.

Temporal perspective:

- Automated driving could become technically feasible after 2035 without safety drivers, even in urban areas, given appropriate R&D efforts and harmonized regulation.



The opportunities from an overall societal perspective

Fewer accidents due to "man & machine" team approach



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The goal is fewer accidents on the roads,

- which, according to current knowledge, is more likely to be achieved and proven by an assistance approach than by automation. For this purpose, it is necessary to assist in all (emergency) situations and, if necessary, to intervene in a protective manner, but never to release the human from the active driving task.

Temporal perspective:

- L2 hands-free systems with strict driver monitoring have been introduced in North America and are now also approved in Germany¹.
- Assistance systems such as automated emergency braking are being continuously developed.



Image: © Continental AG

The opportunities from an overall societal perspective

Technological advancement and assertion in international competition



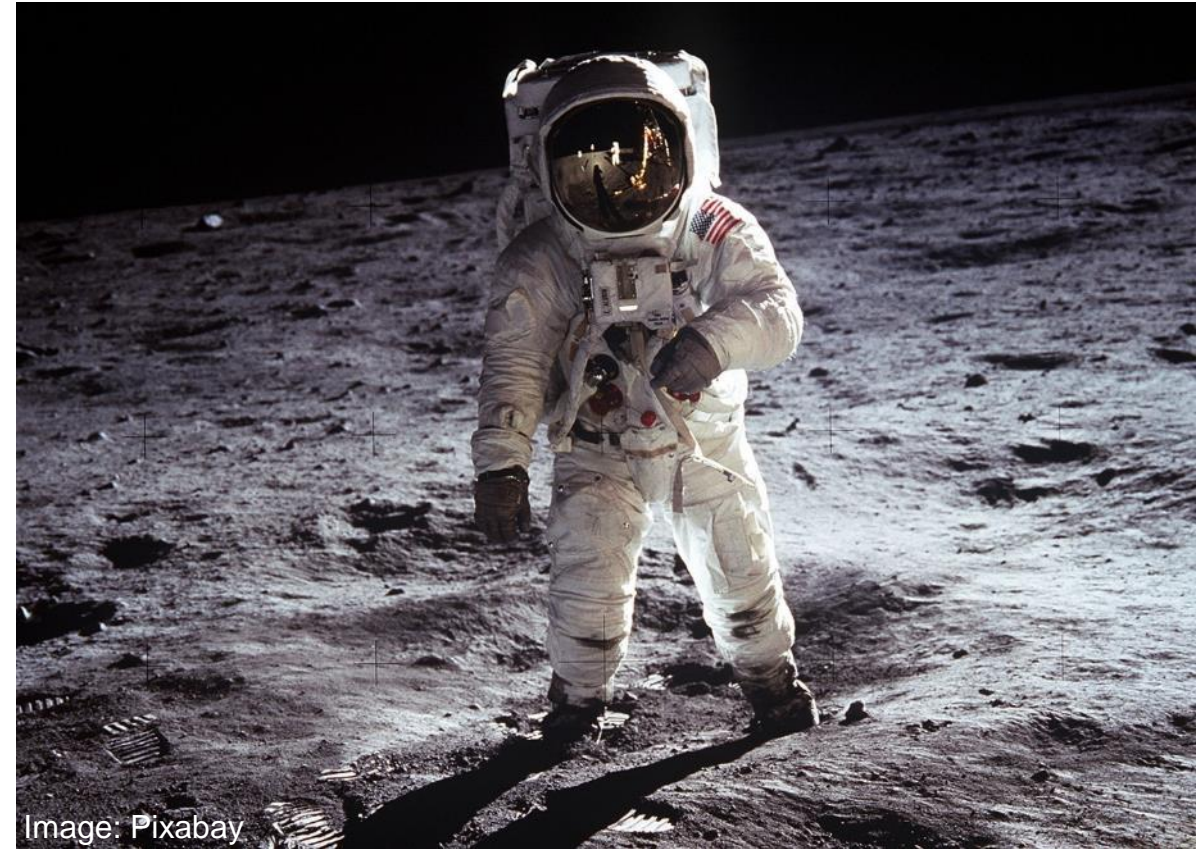
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The goal is to master the technological challenges of safe, automated driving, whereby

- spillover effects are expected for many technologies, in particular for artificial intelligence in safety-relevant applications, e.g. medical technology - comparable to NASA's Apollo program -
- and the technology leadership of the German automotive industry can be ensured and in doing so dependency on US and Chinese players avoided as well as
- new innovation ecosystems emerge.

Temporal perspective:

- continuous



The two views

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Opportunities for the individual citizen

- Relaxed and safe travel with usable time shares
- self-determined mobility with one's own vehicle up to old age and also in case of physical impairment
- Reduction of physically demanding work for truck and bus drivers, especially in long-distance traffic

The opportunities for the individual citizen

Relaxed and also safe travel with usable time shares



The goal is more comfortable, safer travel with more personally usable time,

- through comprehensive assistance that supports and protects the active driver in all situations, and
- can relieve the driver of driving duties on selected long-distance routes and thus "donate" usable time.

Temporal perspective:

- Assistance systems and first automated (L3) systems are in series production¹ and in continuous expansion.



Image: © Mercedes-Benz Group AG

The opportunities for the individual citizen

Self-determined mobility into old age and even with physical impairment



The goal is self-determined travel for all

- by automating private vehicles in a broad application, especially also in rural and urban areas, in order to travel independently of third parties up to old age and also in case of blindness for instance.

Temporal perspective:

- Due to the very complex application, this is not expected earlier than 2030/35 and initially in Japan due to the focus there.



Image: UNICARagil

The opportunities for the individual citizen

Reduction of physically demanding work for truck and bus drivers



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The goal is to reduce unhealthy workplaces,

- by focusing the operations of professional drivers on short distribution routes (in complex urban domains) and completely eliminating long-distance driving.

Temporal perspective:

- Truck L4 systems are in development and are expected to be in place this decade, especially on highways between major logistics centers or factories in the southern states of the US. Until then, the focus is on prevention through fitness options in an ergonomically designed cab¹.



Image: © Daimler AG



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