

Planning for Autonomous Vehicles?



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Presenters

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Terminology

Technically not all the same, but in everyday speech used interchangeably

Autonomous Vehicles (AVs)

Driverless Cars

Automated Cars



Connected
Autonomous
Vehicles (CAVs)













Robotic Cars



Levels of Autonomy

Autonomous driving levels according to NHTSA

NHTSA Levels	0 No automation	1 Function-specific automation	2 Combined function automation	3 Limited self-driving automation	4 Full self-driving automation
	Warning telltale lights & automatic convenience	Cruise control, automatic braking & lane keeping	Adaptive cruise control with lane centering	Driverless Car	Prototypes
Type of control					
Legal & moral responsibility					
Safety requirements (global scenario)	Seatbelts & airbags optional	Seatbelts mandatory & airbags optional	Seatbelts & airbags mandatory	Seatbelts & airbags mandatory	Eventual relaxation of legislation
Time accepted for inattentiveness	< 2 sec	< 2 sec	< 2 sec	Transition time of about 15 – 20 sec	NA – only input destination
Influence to vehicle interior	NA	NA	NA	Minimal	Potential paradigm shift
	1980s	2000s	2015	2025	2035

Majority of vehicles on roads in 2025

Benefits

- Save time and reduce driver stress
- Reduce accidents, safer journey
- Reduce lane widths and parking space
- Mobility for non-drivers, elders and disabled
- Increased Municipal Revenues
- Reduce the number of cars
- Mobility on Demand Transit
- Reduce costs



Costs

- Loss of traditional driver related jobs
- Technological vulnerabilities
- Ethical dilemmas
- Increased VMT



Impact on the City Form

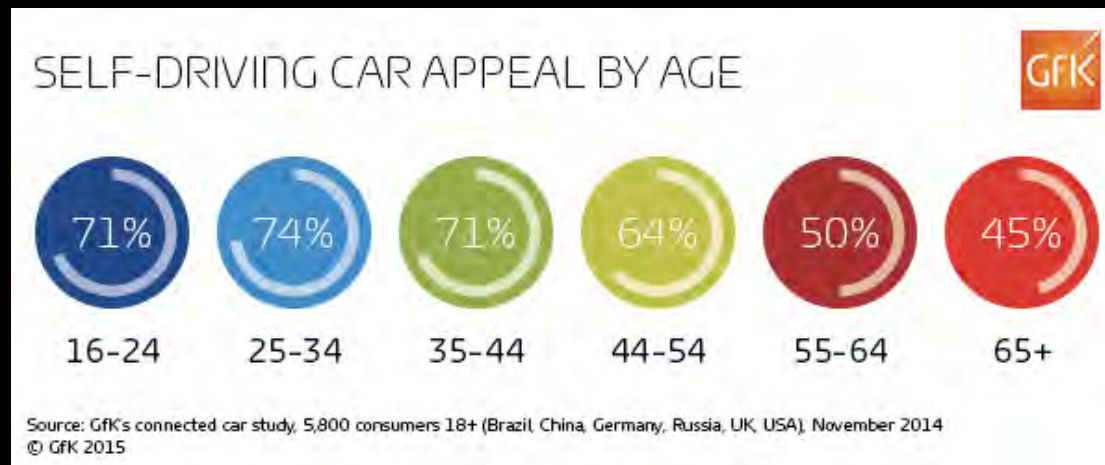
- Sprawl inducer or urban lifestyle promotor?
- Future roadway design?
- Public infrastructure requirements?
- Needed changes in zoning regulations?
- Parking needs?



Acceptance by the Public?



Public willingness to adopt this new technology will have a major impact on the timing of related physical changes in our built environment



They are already here

- Tesla: Level 2 (monitored driving) available today
- Audi: Level 3 (driver in position, but not full monitoring) in 2017
- Google/Waymo: Level 4 (no steering wheel) in 2018-20
- Uber/Otto: completed 120-mile shipment in driverless truck in 2016
- Bishop Ranch, CA office park has 2 fully autonomous shuttle buses
- Phoenix is running a ride-hailing program w Waymo's minivan AVs
- Customers can request a driverless uber in Pittsburgh today



6%

OF PLANS
CONSIDER THE
POTENTIAL EFFECT
OF DRIVERLESS
TECHNOLOGY

3%

OF PLANS TAKE INTO
ACCOUNT PRIVATE
TRANSPORTATION
NETWORK COMPANIES
(TNCS) SUCH AS UBER
OR LYFT, DESPITE
THE FACT THAT THEY
OPERATE IN 60 OF THE
68 MARKETS

20%

OF PLANS INCLUDE
ROAD DIETS OR OTHER
PLANS TO REDUCE
ROAD CAPACITY
OR LONG-TERM
MAINTENANCE COSTS

50%

OF PLANS
CONTAIN EXPLICIT
RECOMMENDATIONS
FOR NEW HIGHWAY
CONSTRUCTION

12%

OF PLANS ARE
CLEAR THAT NO
NEW HIGHWAYS
ARE UNDER
CONSIDERATION

Lack of Planning for the Age of Autonomous Vehicles



Source, "City of the Future: Technology and
Mobility", National League of Cities, 2015

Changes in the past year

- May 2017, Nathan Deal signed bill that allows self driving cars to operate on public roads
- Tests of self driving cars conducted this fall in ATL
- \$3M infrastructure upgrade for North Ave “Smart Corridor”
- Reconsideration of rail expansion plans
- APA to craft policy guide on AVs in 2018



Plans being made today

- Oslo will ban private vehicles from the city center by 2019
- Helsinki has planned a publically-owned mobility-on-demand system that will make private car ownership obsolete by 2025
- US DOT: 2016 \$40M Smart City Challenge grant
- Columbus OH to develop fleet of AV shuttles to aid in first/last mile connectivity
- Ohio Turnpike has installed fiber optic cables along 241 miles – to relay traffic and weather info
- Palo Alto has 11 “smart” intersections

