

SmartDrivingCars the Road to Positive Environmental Impacts



by

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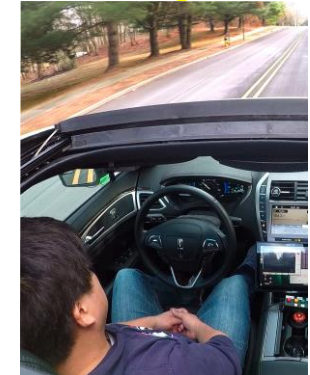
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Presented at

NE Legislative Climate & Energy Conference

May 11, 2018

Princeton, NJ



Making Sure We Are Using the Same Terminology...

- Lots of confusion... ‘Connected’; ‘Autonomous’, ‘Automated’, ‘4 NHTSA Levels’ ‘5 SAE Levels’...
- Only 3 kinds: Classified by their **Business Case**, Not Technology
 - ‘Safe-Driving Cars... (Trucks or Buses)’
 - Don’t Crash, Stay in their lane and keep us from mis-behaving
 - Always on **Automated Emergency Braking, Lane Centering & and Speed Limiting**
 - **Delivers: Safety**
 - Insurance Can/Should Promote Wide-spread **Adoption & Enhancement** w/o Government Mandate

[Lexus and Toyota: Automated Braking is Standard on Nearly Every Model and Trim Level by End of 2017](#)



Sort of works, but not nearly well enough



Big-time Implications...Safe-Driving Cars

- **Safety!**

- You don't need to take your hands off the wheel or feet off the pedals or be chauffeured to achieve **safety**.

- Insurance

- Either results in or be a result of **Insurance**.



- Today Auto Casualty does **NOT** give you a discount if your car has SafeDriving Technology.

- » That will change! Hopefully very soon

- Health Care system ↓

- Emergency rooms, Ambulances, Organ donor, Social Security (fewer die younger)

- Body shops, replacement parts (availability & production) ↓

- Police & courts ↓

- Technology will probably not enable you to speed excessively or run red lights,

When: Soon with New Cars and accelerated with After-market.

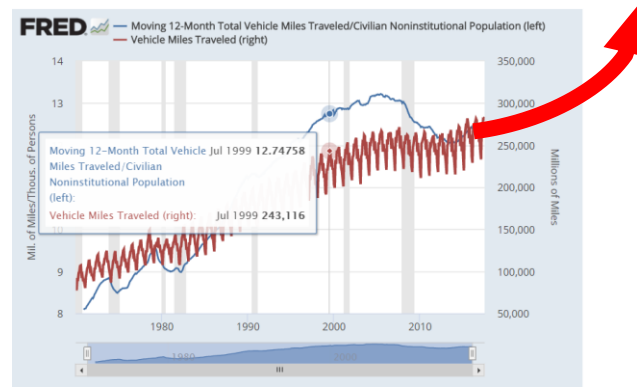
“Self-driving Cars

- Lots of confusion... ‘Connected’; ‘Autonomous’, ‘Automated’, ‘4 NHTSA Levels’ ‘5 SAE Levels’...
- Only 3 kinds:
 - ‘Safe-Driving Cars... (Trucks or Buses)’
 - Always on Automated Emergency Braking, Lane Centering & Speed Limiting
 - Delivers: Safety
 - Needs Insurance to Promote Wide-spread Adoption w/o Government Mandate
 - ‘Self-Driving Cars... (Trucks or Buses)’ <https://electrek.co/2017/06/12/first-drive-tesla-autopilot-2-0-autopark/>



Big-time Implications...Self-Driving Cars

- 1st and Foremost: provides **Comfort & Convenience To the Driver**
 - VMT (Vehicle Miles Travelled) goes through the roof
 - Land ...Far away & cheap becomes more attractive
 - Acceleration of sprawl
 - Driving as an occupation becomes much more attractive
 - Traditional auto companies sell more cars at higher profit
 - BMW becomes the ‘Ultimate Riding Machine’
- **When:** Will begin to happen soon with those most interested in taking advantage of far away cheap land will be first buyers.



Driverless



- Needs Insurance
- 'Self-Driving Cars'
 - Safe-Driving + Always Hands-Off, Feet-Off; No Steering Wheel or Pedals
 - On Some streets
 - Delivers: Use of Streets
- 'Driverless Cars ... (Cars, Trucks or Buses)
 - Safe-Driving + **Always: Hands-Off, Feet-Off; No Steering Wheel or Pedals**
 - Sharing Some Streets at Some Times with Conventionally-driven vehicles
 - Delivers: **Mobility for All + Substantial Environmental Benefits**

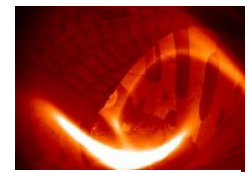
Big-time Implications...Driverless Cars

- Affordable High-quality LoS Mobility for All**

- VMT (Vehicle Miles Travelled) goes through the roof
 - **More** people able to travel **More** in order to take advantage of **More**.
 - Unless there is **Substantial Ride**-sharing.
 - We’ve analyzed the ~1Billion personTrips across USA on a typical day
 - While there is vast spatial & temporal diffusivity,
 - there are enormous opportunities for ride-sharing, 1st/last mile to conventional transit & Amtrak
 - autonomousTaxi Service could capture those opportunities
 - » Reducing VMT by 50%
 - » 5x increase in NJ Transit Rail Ridership
 - » “100x” increase in Amtrak ridership

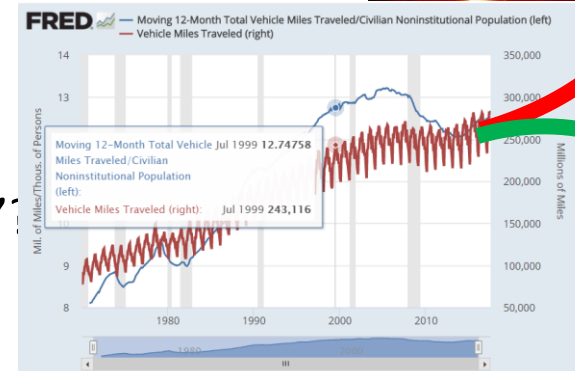


[Why Nuclear Fusion Is Always 30 Years Away](#)



- When:**

- Is it like “Cheap Energy from Nuclear Fusion”?



Hyperdrive

'Wild West' Ohio Beckons Self-Driving Cars Even After Uber Death

By [Craig Trudell](#)

May 9, 2018, 2:00 PM EDT

- ▶ Governor's order enables testing on any public roads in Ohio
- ▶ Companies will be able to test without drivers at the wheel

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JOHN R. KASICH
GOVERNOR
STATE OF OHIO

Executive Order 2018-04K

Establishing Guidelines for Testing Autonomous Vehicles

WHEREAS, increasing technological innovation in the automotive sector has produced vehicles capable of performing some or all of the tasks normally associated with operating a motor vehicle (*i.e.*, "autonomous vehicles"); and

WHEREAS, research by the National Highway Traffic Safety Administration (NHTSA)

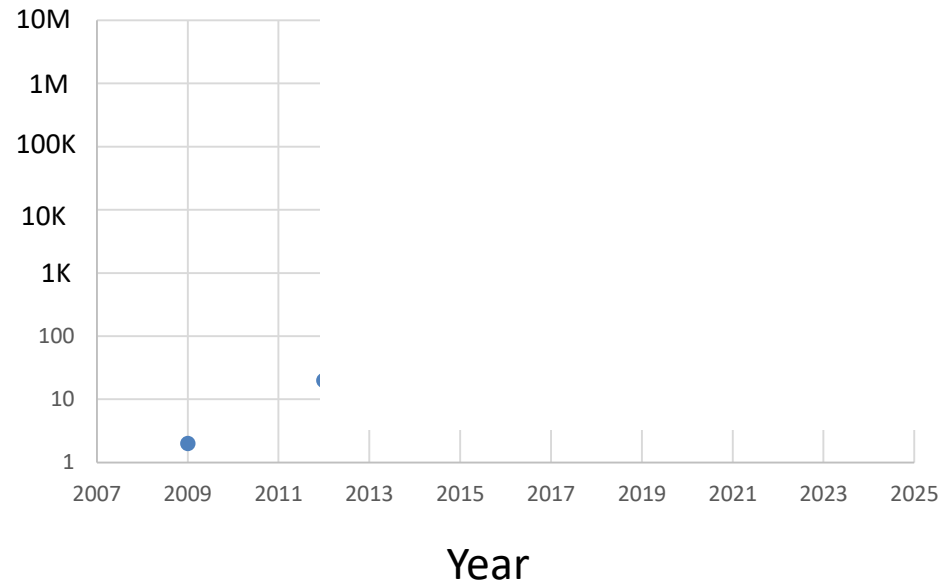
NOW THEREFORE, I, John R. Kasich, Governor of the State of Ohio, by virtue of the authority vested in me by the Constitution and laws of the State of Ohio, do hereby order and direct that:

6. All autonomous vehicles tested in Ohio must have a designated operator. Designated operators are not required to be inside the vehicle. Designated operator(s) must:



Dynamics of Google/Waymo's Deployment of Driverless

Google/Waymo Purchase of Driverless Cars

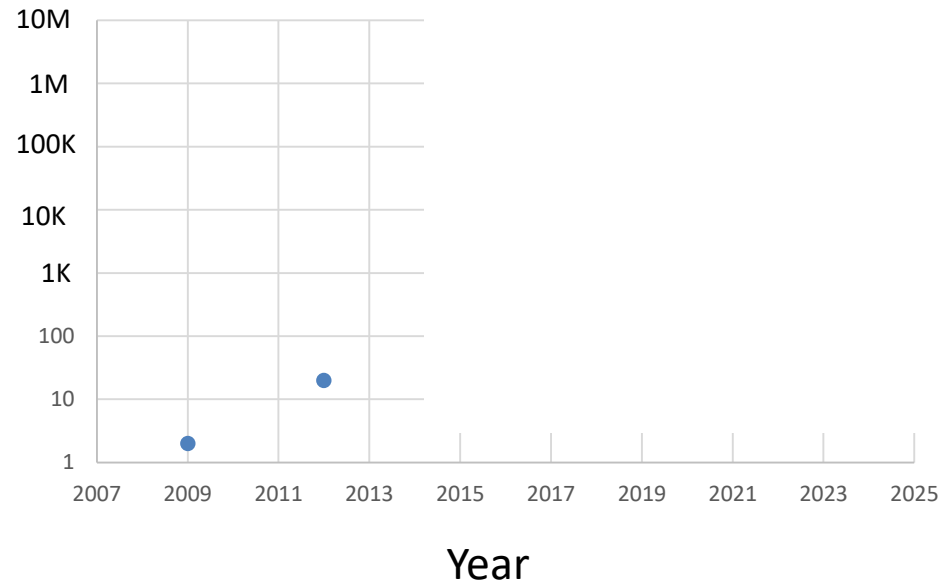


2009



Dynamics of Google/Waymo's Deployment of Driverless

Google/Waymo Purchase of Driverless Cars



2009

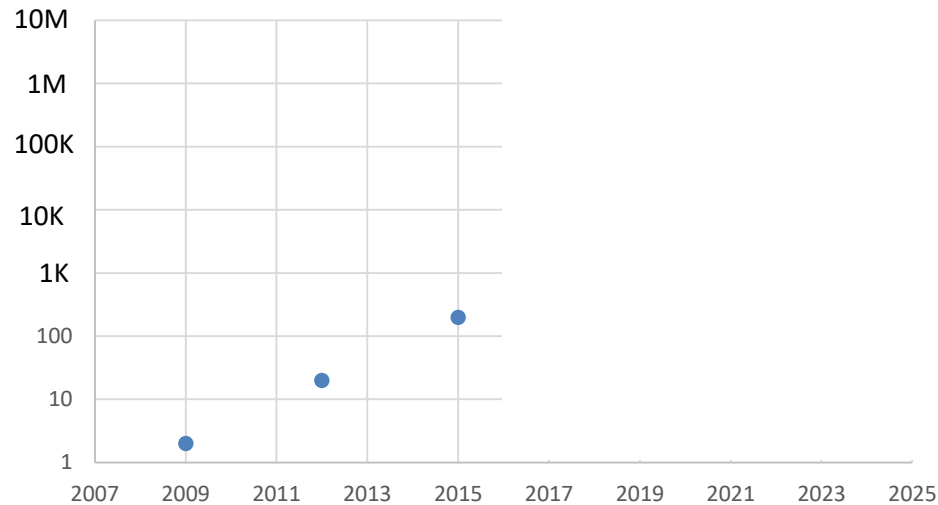


2012



Dynamics of Google/Waymo's Deployment of Driverless

Google/Waymo Purchase of Driverless Cars



2009



2012

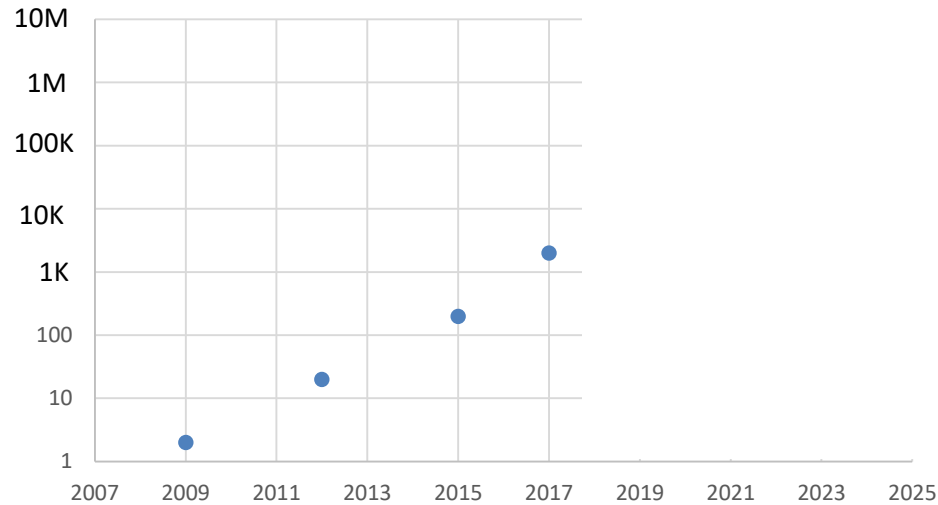


Year
2015



Dynamics of Google/Waymo's Deployment of Driverless

Google/Waymo Purchase of Driverless Cars



2009



2012



Year
2015

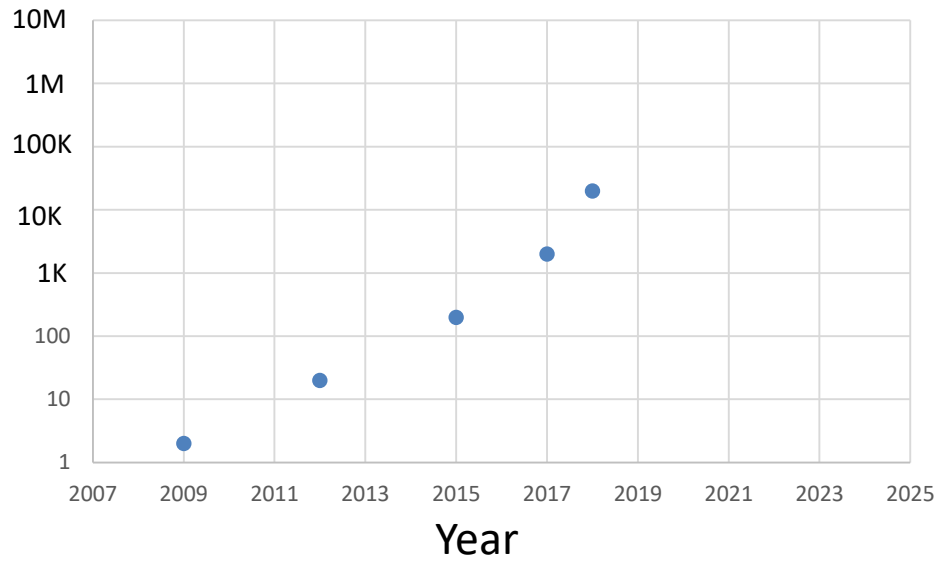


2017



Dynamics of Google/Waymo's Deployment of Driverless

Google/Waymo Purchase of Driverless Cars



2009



2012



2015



2017

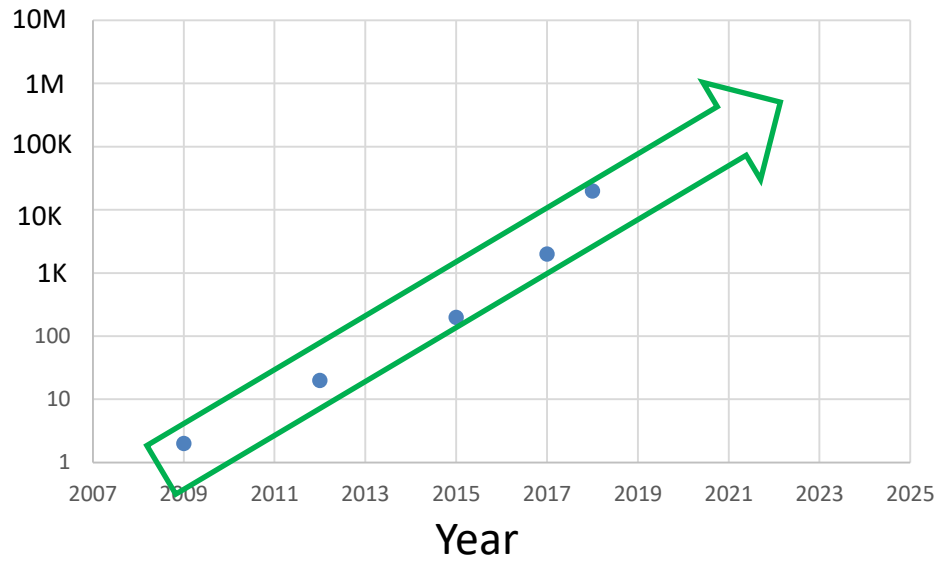


2018



Dynamics of Google/Waymo's Deployment of Driverless

Google/Waymo Purchase of Driverless Cars



10X
every 2 years
(Waymo's Kornhauser Law)

2009



2012



2015



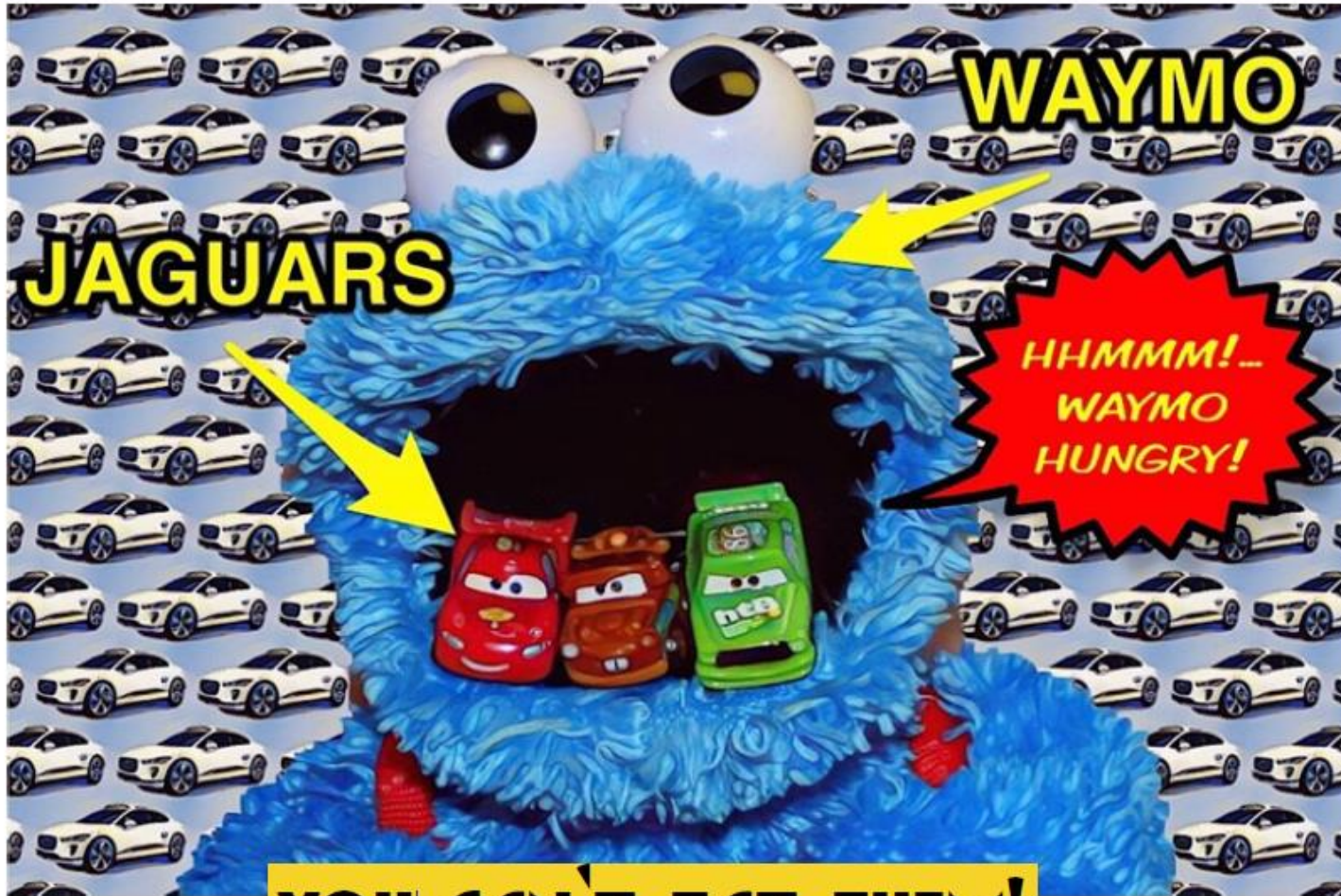
2017



2018



WHAT WILL WAYMO DO WITH 20,000 JAGUARS?



YOU CAN'T EAT THEM!

WHAT WILL WAYMO DO WITH 20,000 JAGUARS?

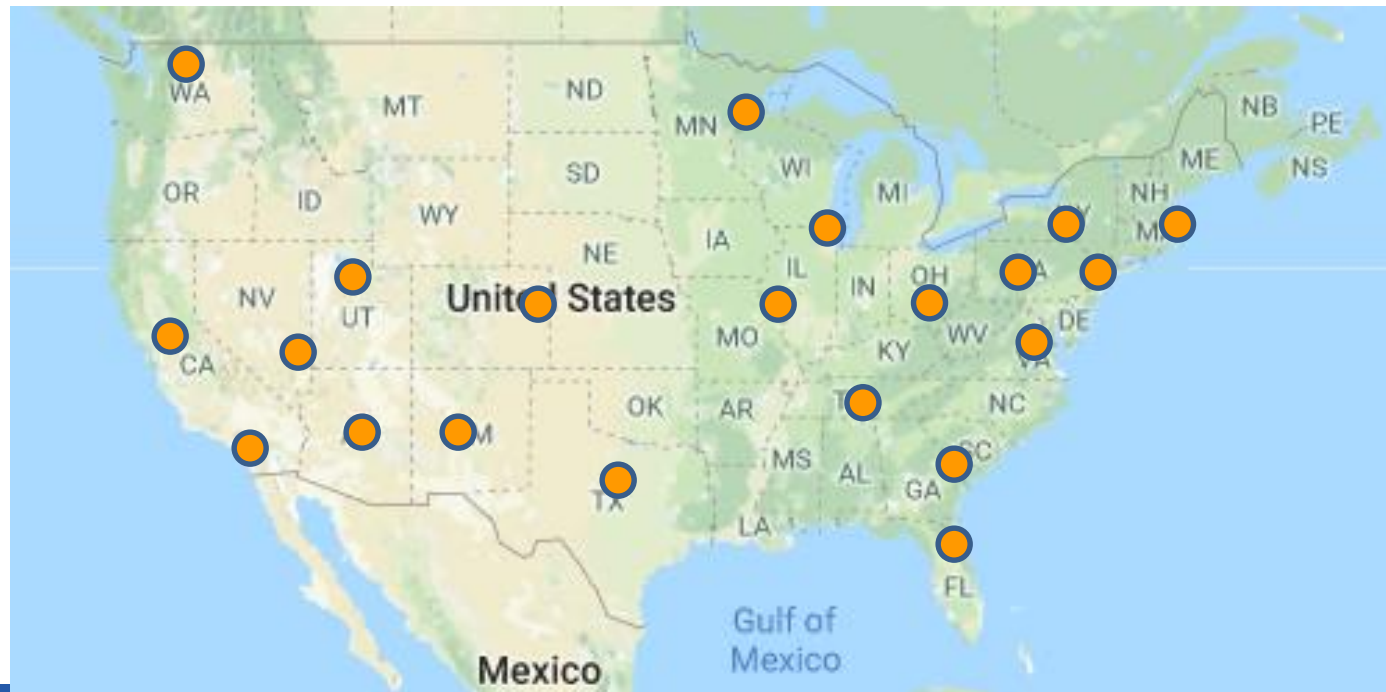


Welcome to my studio apartment!

PROVIDE HOUSING FOR THE HOMELESS IN SAN FRANCISCO?

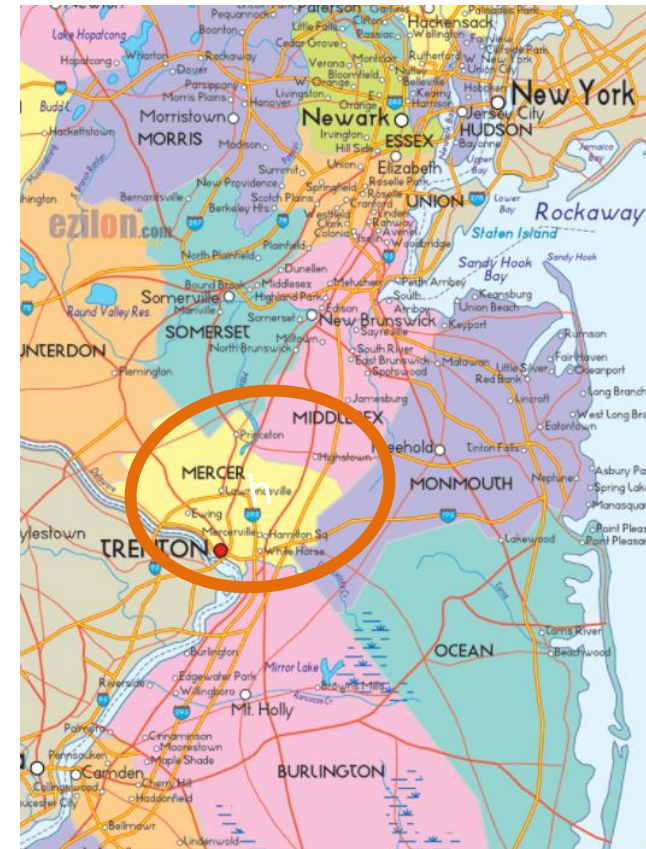
Where will Waymo Deploy 20,000 autonomous Taxis

- Maybe they'll "Spread the Mobility Experience"
 - operate 1K in 20 different "cities"



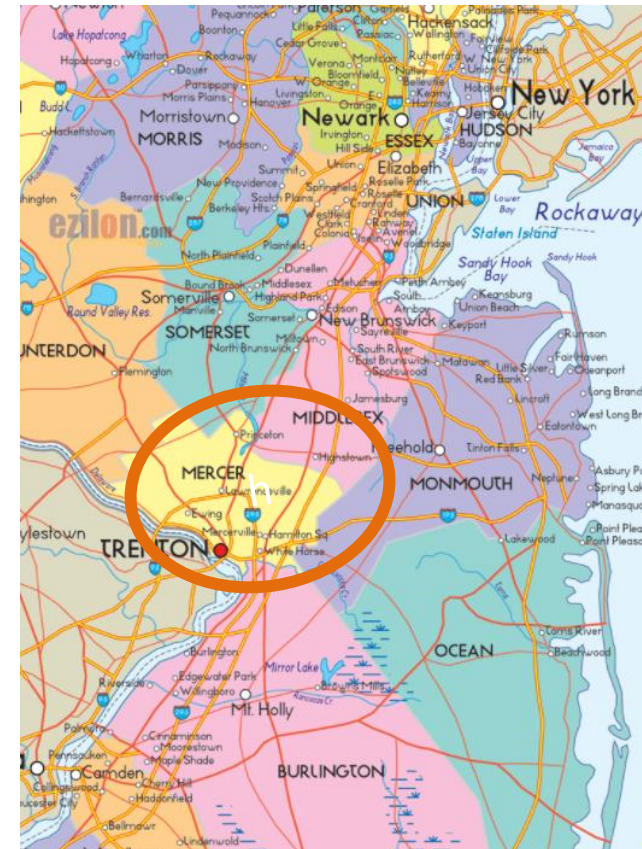
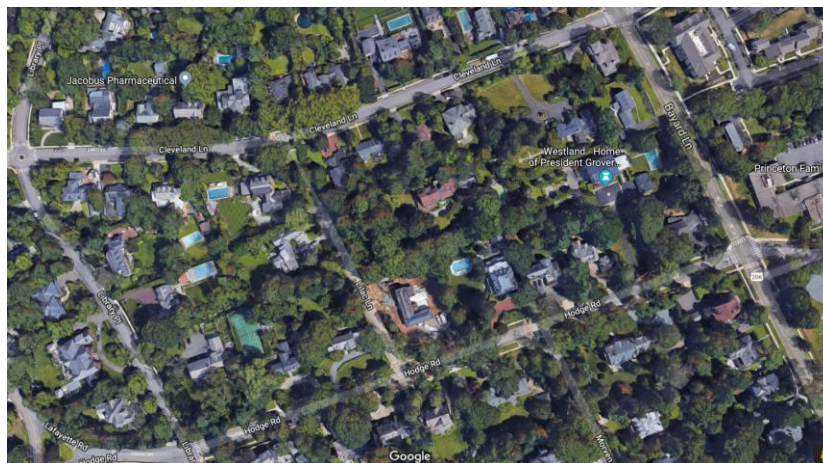
Where will Waymo Deploy 20,000 autonomousTaxis

- Maybe they'll "Spread the Mobility Experience"
 - operate 1K in 20 different "cities"
- How about "Central New Jersey" ?
 - Microcosm of USA
- Pop: ~400K
- Intra-area Trips/day: ~ 1.0M/day
- 1K aTaxis would serve ~5%
 - Ideal market share to prove concept



What Might Interest Waymo to operate 1,000 aTaxis in Central NJ?

























- Bottom up Coalition of streets/neighborhoods who said **YES, Please!**
- Please serve me, **and**
- You can run down my street



2nd Annual Princeton SmartDrivingCar Summit

May 16, 17, 2018

FEATURED 2018 SPEAKERS

- | | | | | | | | |
|---|---|--|--|---|---|--|---|
| 
Christine O'Brien
President
Insurance Council of New Jersey | 
Paul Brubaker
President and CEO
ATI21 | 
Alain Kornhauser
Professor
Princeton University | 
Alberto Broggi
Professor
University of Parma | 
Sami Naim
Senior Public Policy Manager
Lyft | 
John Eggert
Director of Automotive
Velodyne | 
Justin Erlich
Head of Policy, Autonomous Vehicles & Urban Aviation
Uber | 
Michel Parent
President
AutoKAB |
| 
Fengmin Gong
VP, Info Security Strategy & Didi Research
Didi Chuxing | 
Adam Jonas
Head of Global Auto Research
Morgan Stanley | 
Danny Shapiro
Sr. Director of Automotive
NVIDIA | 
Gilbert Gagnaire
Founder
EasyMile | 
Stanley Young
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National Renewable Energy Laboratory | 
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Application Engineer
Zgethere | 
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Coast Autonomous | 
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Independent Consultant
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Principal
Central Jersey | 
Bern Grush
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Grush Niles Strategic | 
Fred Fishkin
Greenville County Council |



Discussion!

Thank You

alaink@princeton.edu

www.SmartDrivingCar.com