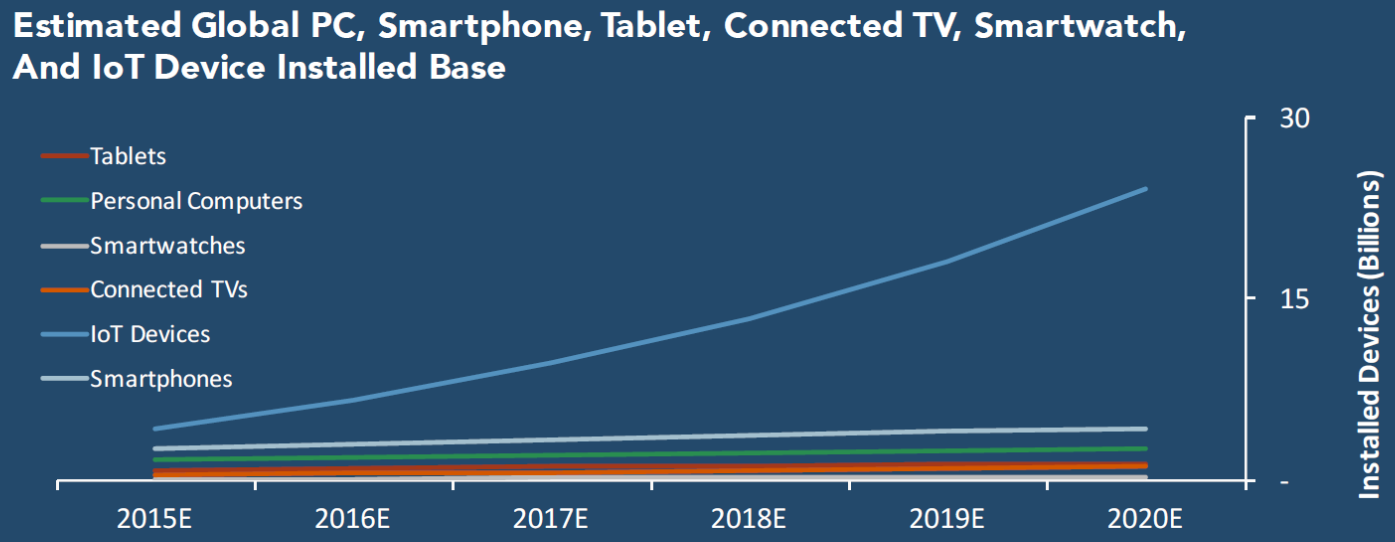
Don’t just sit on your real estate and let tech pass you by

CIASF COMMERCIAL INDUSTRIAL ASSOCIATION OF SOUTH FLORIDA

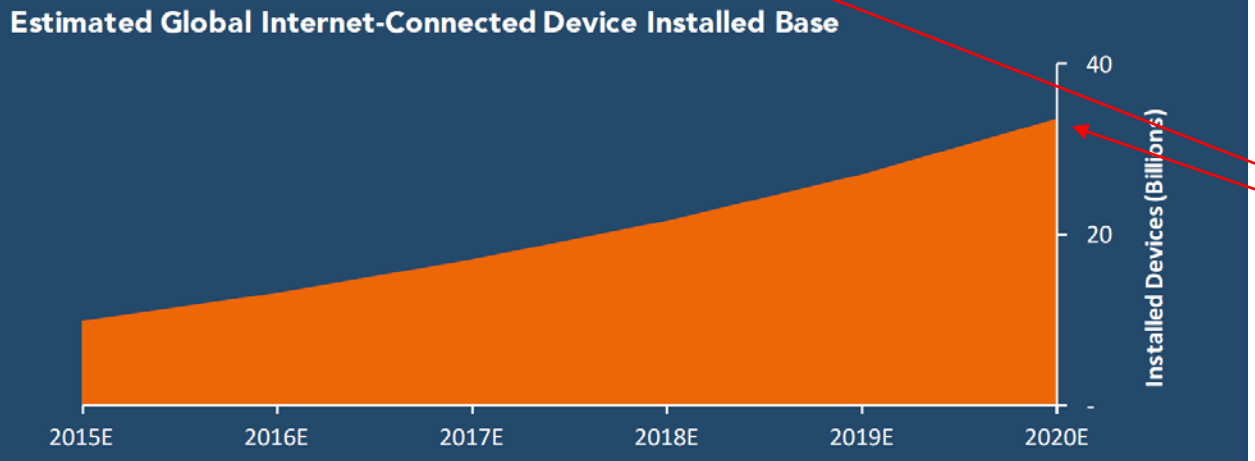
(Predictions)

DEVICES UNDER THE INTERNET OF THINGS



Source: BI Intelligence Estimates, 2015

BY 2020, 34 BILLION DEVICES WILL BE CONNECTED TO THE INTERNET



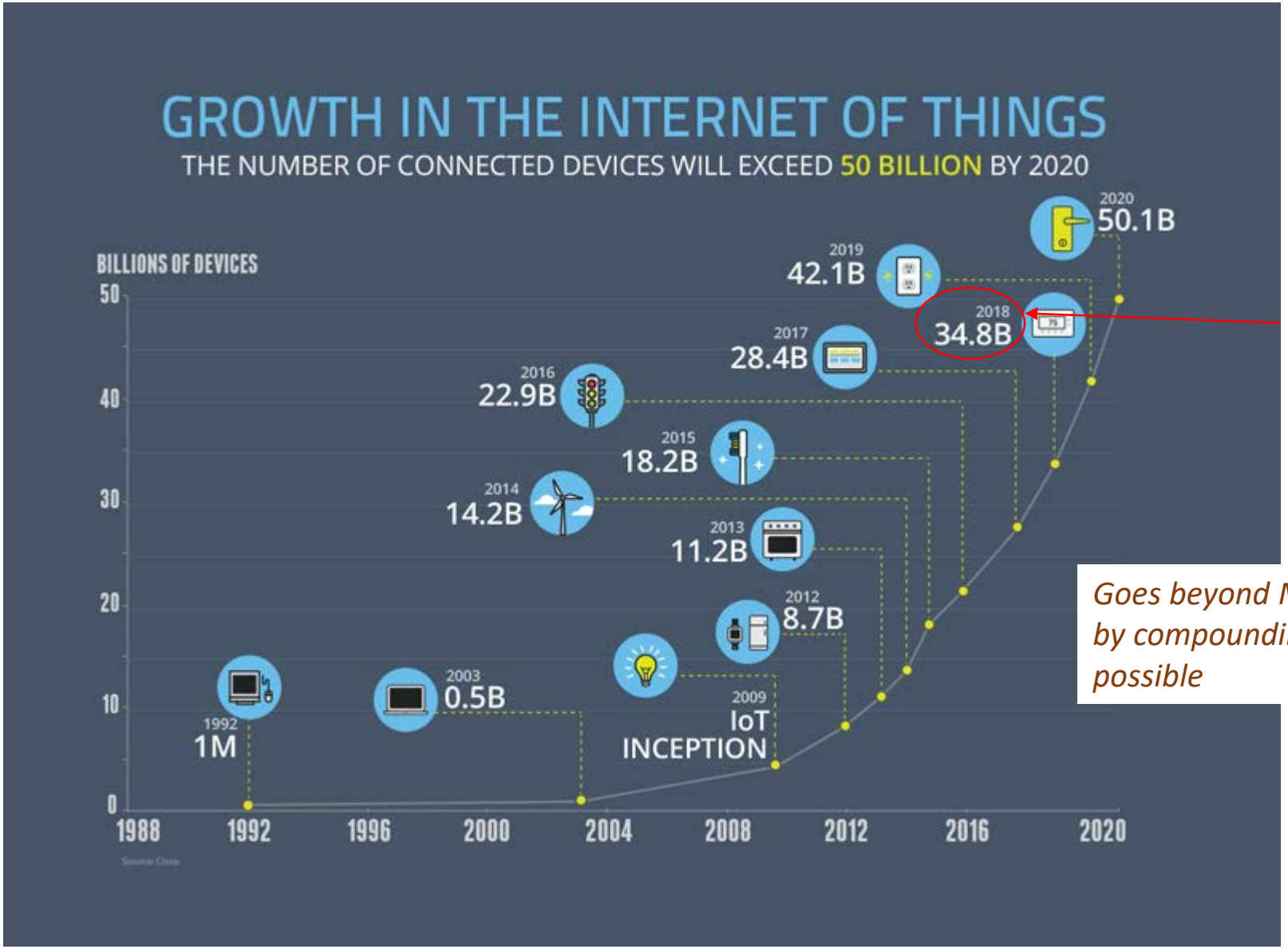
BI INTELLIGENCE

Source: BI Intelligence Estimates, 2015

34 Billion by 2020

2015 Prediction

(Reality) **Cisco: By 2020 over 50-Billion devices will be connected to the internet.**

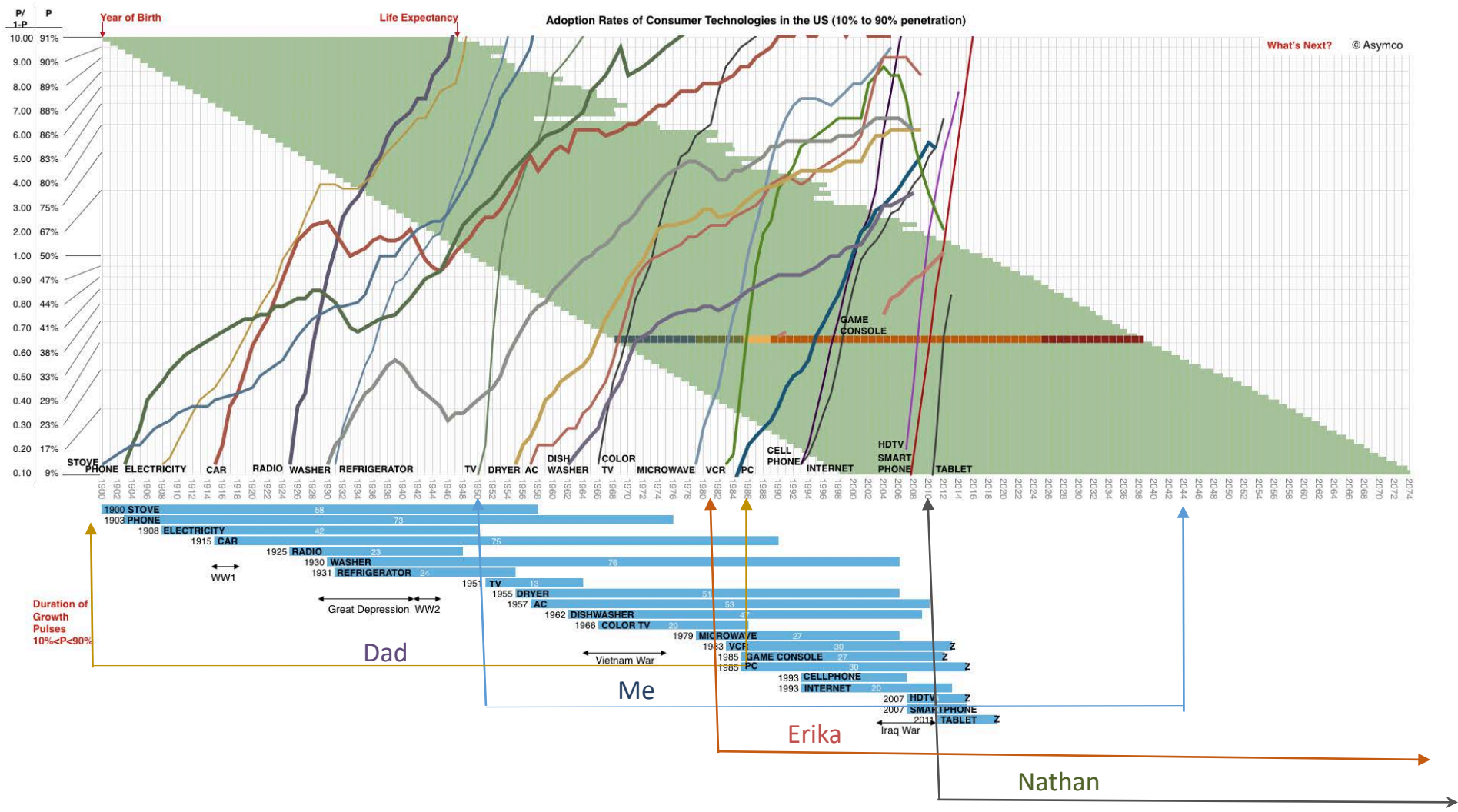


2018 (we're there already)

Goes beyond Moore's Law by compounding what is possible

By 2022, 1 trillion networked sensors will be embedded in the world around us, with up to [45 trillion in 20 years]

https://www.huffingtonpost.com/entry/cisco-enterprises-are-leading-the-internet-of-things_us_59a41fcee4b0a62d0987b0c6

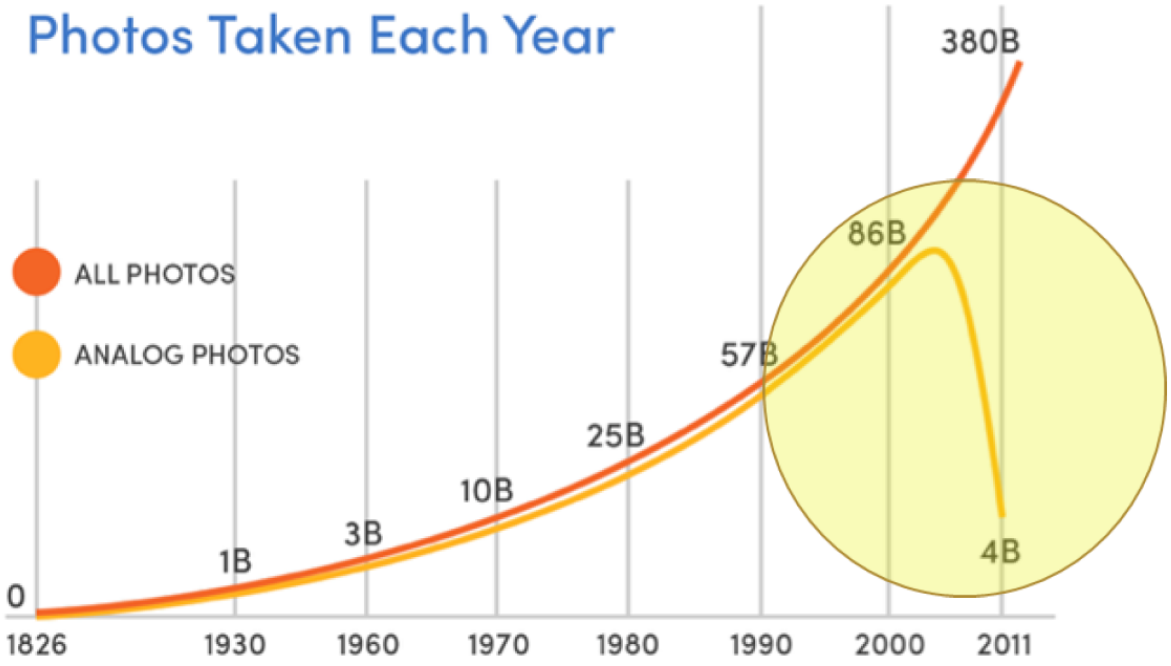


- My father: *1892-1986 (Electric Stoves and cars, to Neil Armstrong and VCRs)*
- Me: *1950-2044 (Color TV to autonomous vehicles)*
- *Erika: 1981-2082: (VCRs and PCs through watching her son learn and do …anything)*
- Nathan/Our Kids: *2010 – 2135 (Internet of Things through direct connection to the Cloud)*

http://www.asymco.com/2013/11/18/seeing-whats-next-2/

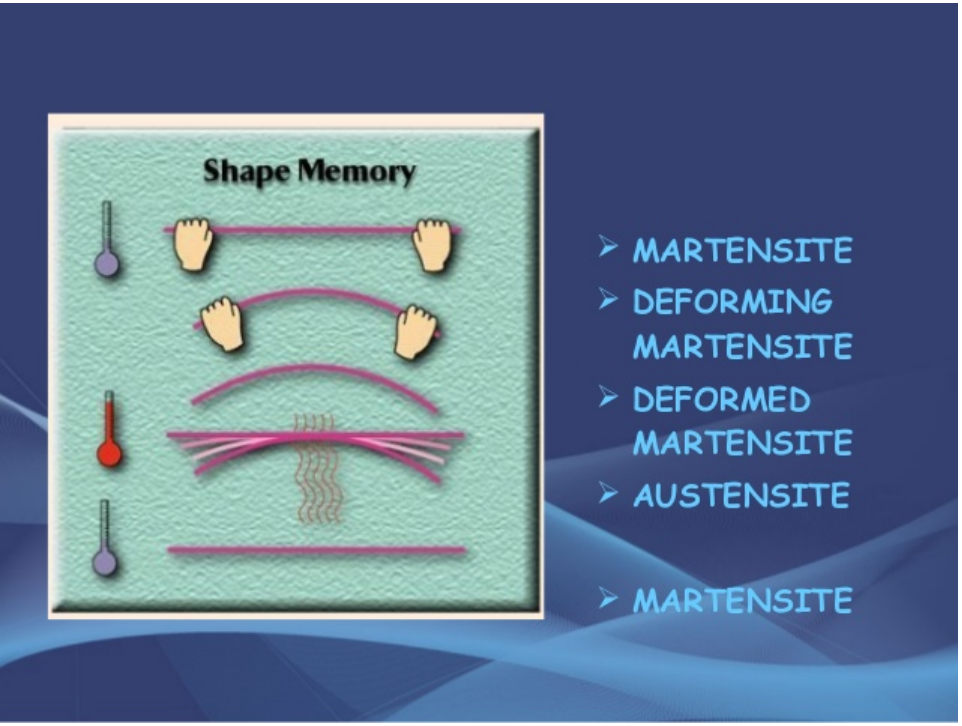
You've got a long way to go … and your children have even longer, so …

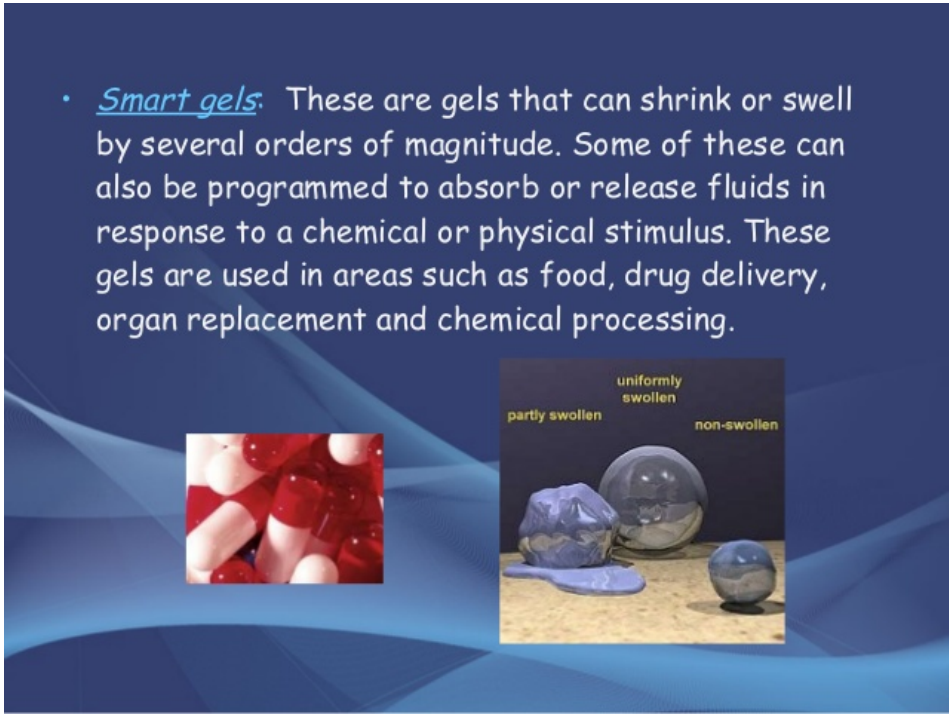
Moore's Law – Don't Get Kodak'd!



Smart Materials

3rd International Conference on Smart Materials & Structures "welcome all" to the Grand Three Day's Scientific Event on Smart Materials and Intelligent Structures which was held on **March 20-22, 2017** in **Orlando, USA**.

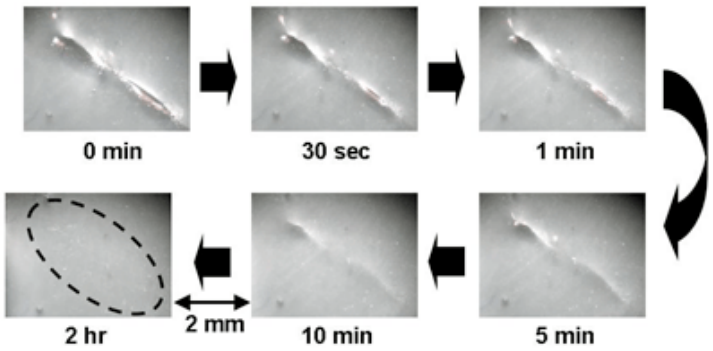




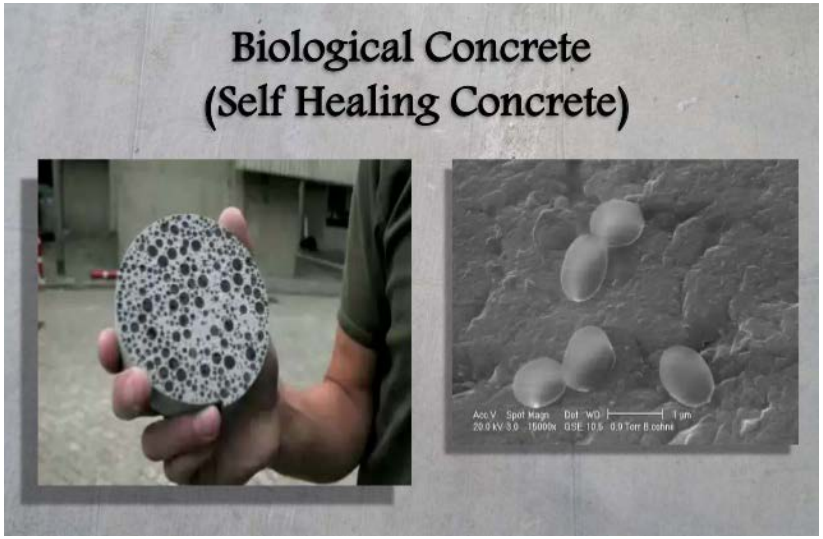
http://iopscience.iop.org/article/10.1088/1757-899X/293/1/011001

So many applications for real estate…

Self-repairing liners



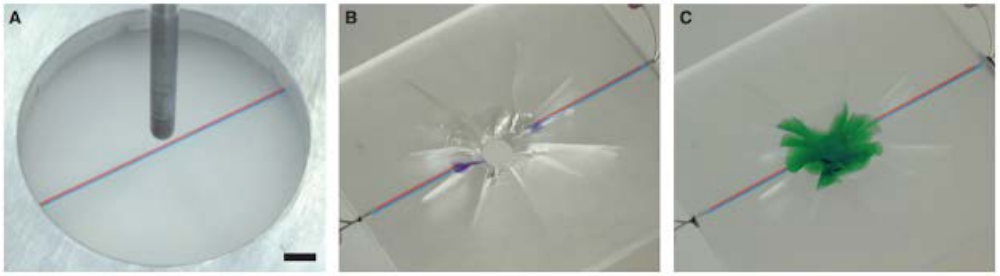
http://italclay.com/nanoclay-waterproofing-liners/



www.foundationsac.org

Self-healing Glass

http://www.businessinsider.com/self-healing-cell-phone-research-2017-4



http://www.rheothing.com/2014/05/a-self-healing-polymer-for-really-big.html

Imagine the possibities – how this will change where we can live, disaster preparedness, and more

Basalt Rebar

Developed at U of Miami.
Weighs ounces, not pounds.
Doesn't rust or shrink.

https://globenewswire.com/news-release/2017/04/07/956621/0/en/Paymeon-Inc-s-Basalt-America-announces-FRP-s-Fiber-Reinforced-Polymers-referenced-as-a-megatrend-in-concrete-reinforcement-at-this-week-s-North-American-Pultrusion-Conference-in-At.htm I

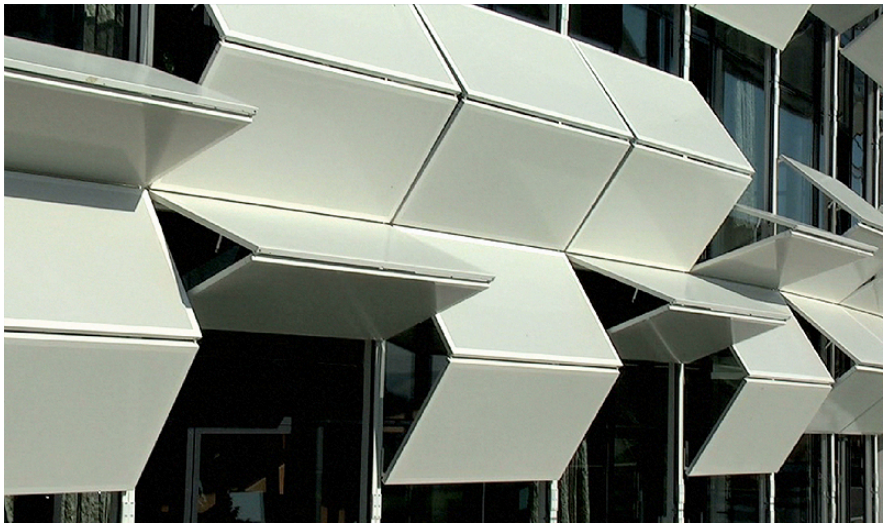
Hollow Rebar

Nearing commercialization is the HollowRebar from Composite Rebar Technologies Inc. (CRT, Madison, Wis.). The hollow core can serve as the conduit for data, electric, or voice wiring or fiber-optic cable, or it can house instrumentation (e.g., sensors), or it can permit inspection for smart-structure applications. It may even have usage in climate control (e.g., circulating radiant-heating fluids to keep bridges from freezing). Additionally, the hollow core provides the potential to connect one section of hollow rebar with another, which could expand application opportunities. Source: Composite Rebar Technologies Inc. *www.hollowrebar.com*

Glass Fiber-reinforced Rebar

http://www.compositesworld.com/articles/a-hidden-revolution-frp-rebar-gains-strength

Kiefer Technic Showroom / Ernst Giselbrecht + Partner



Electrically driven panels that change throughout the day.

http://www.archdaily.com/89270/kiefer-technic-showroom-ernst-giselbrecht-partner

HofmanDujardin

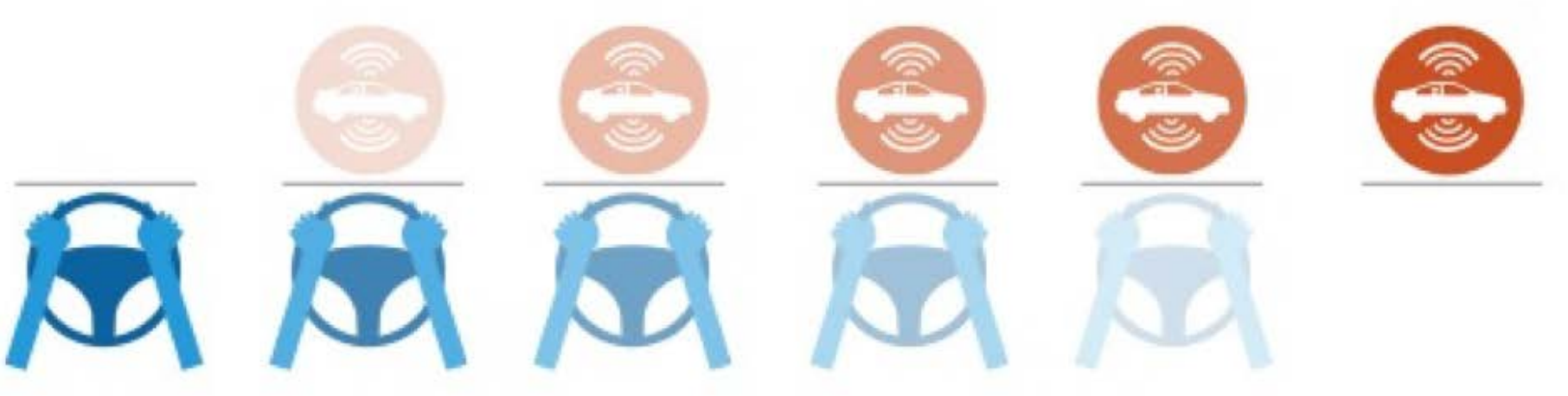
Bloomframe window

https://www.hofmandujardin.nl/bloomframe-window/

Window that becomes a balcony

Autonomous Vehicles: Where we are with these

Five Levels of Vehicle Autonomy



Level 0
No automation: the driver is in complete control of the vehicle at all times.

Level 1
Driver assistance: the vehicle can assist the driver or take control of either the vehicle's speed, through cruise control, or its lane position, through lane guidance.

Level 2
Occasional self-driving: the vehicle can take control of both the vehicle's speed and lane position in some situations, for example on limited-access freeways.

Level 3
Limited self-driving: the vehicle is in full control in some situations, monitors the road and traffic, and will inform the driver when he or she must take control.

Level 4
Full self-driving under certain conditions: the vehicle is in full control for the entire trip in these conditions, such as urban ride-sharing.

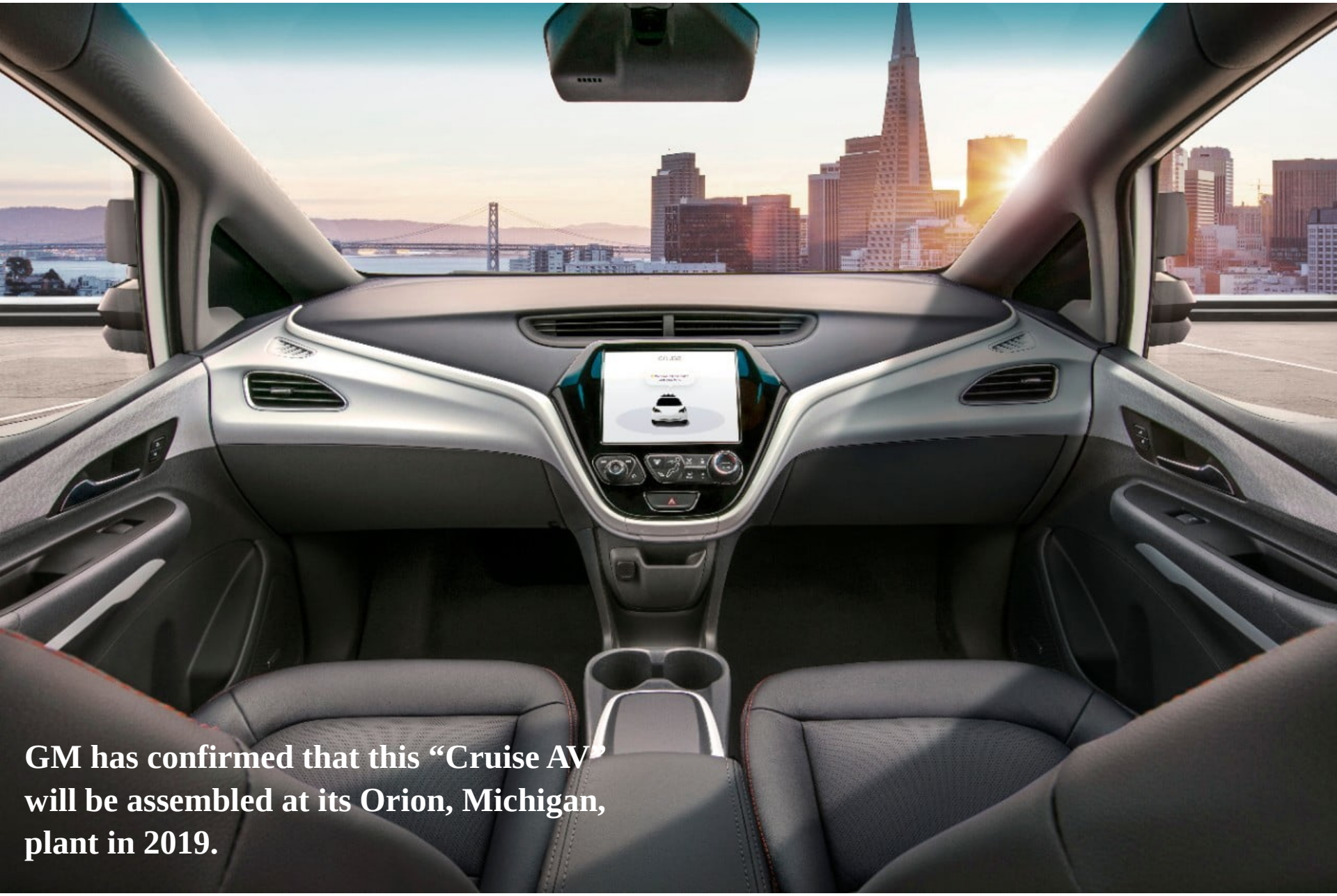
Level 5
Full self-driving under all conditions: the vehicle can operate without a human driver or occupants.

(Was previously 4 levels)

Source: SAE & NHTSA

Automated Vehicles – An Umbrella Term

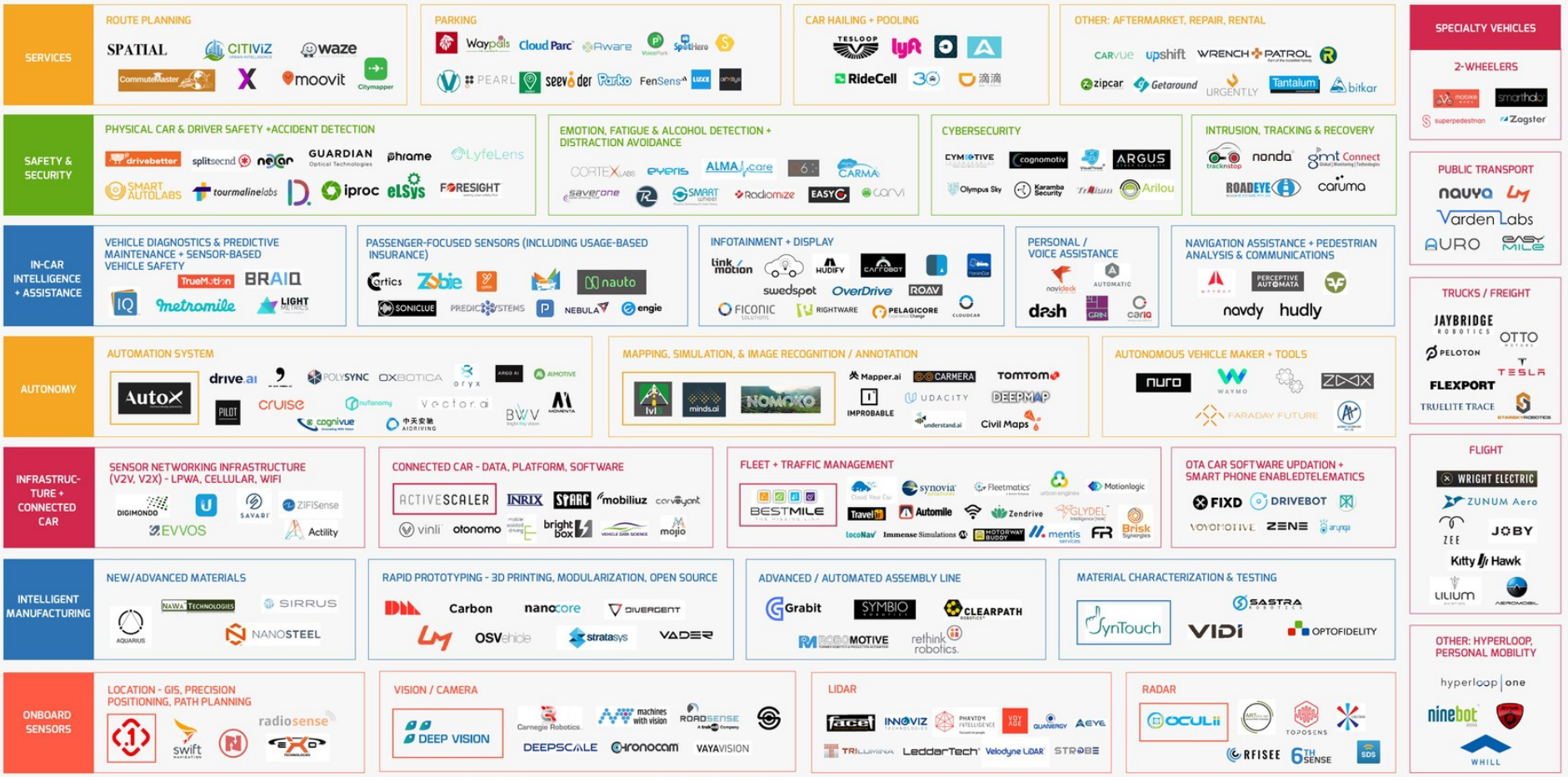
GM says it's serious about commercializing self-driving cars



GM has confirmed that this "Cruise AV" will be assembled at its Orion, Michigan, plant in 2019.

https://www.digitaltrends.com/cars/general-motors-self-driving-car-manufacturing-plans/

… So is everyone else …all 263 of them



"Forget dot coms and social networks. The hotspot for research and investment in Silicon Valley right now is the future of transport."

- Wired Magazine

https://www.wired.com/2017/05/mapped-top-263-companies-racing-toward-autonomous-cars/

Gensler
Research & Insight

STATISTICALLY, THE LEAST RELIABLE PART OF A CAR IS THE DRIVER. **93% of accidents are caused by human error.** 1

2.3M are injured in crashes every year. 2
40K people die in road crashes every year. 2

1 — "National Motor Vehicle Crash Causation Survey"
2 — "Association of Safe International Road Travel"

Truck, bus, delivery, and taxi drivers account for nearly 6 million jobs. Virtually all these jobs will be eliminated within 10-15 years.

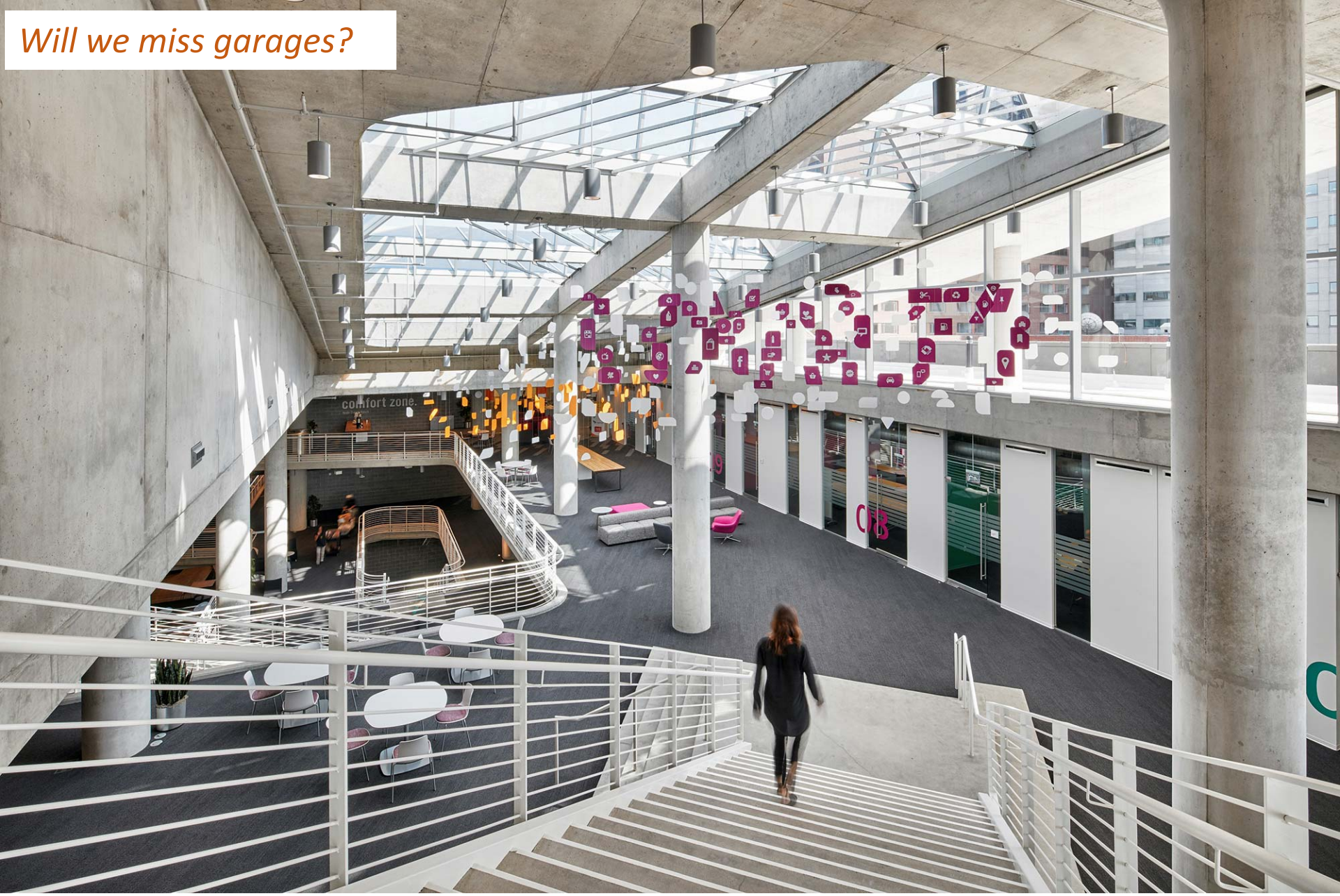
— "Automotive Industry: Employment, Earning, and Hours," *Bureau of Labor Statistics*

https://www.gensler.com/research-insight/publications/dialogue/30/the-game-changer-for-cities-driverless-cars

How much will what we have now be missed?

These views of New York City's Times Square (before and after) show the recently transformed, people-friendly zone that added 110,000 square feet of usable pedestrian space. Image © NYCDOT.

Will we miss garages?



Three above-ground levels of 84.51º Centre are used as parking today, but they have horizontal floors for future conversion to offices or other uses. Image © Garrett Rowland.

Auto liability

Likely to shrink

Cyber risk
tech E&O/IoT

Likely to increase

Products liability

Likely to increase

Transition to full vehicle autonomy

Varying degrees of impact over time

Auto physical damage

Likely no material change

Equipment breakdown/warranty

Likely to increase

Product recall

Likely to increase

Potential shifts in liabilities and premiums

- Liability shifts from driver to manufacturers and technology companies
- **Auto physical damage, cyber, products warranty** may grow
- Exposures will be more complex – cyber/software, car manufacturer, driver
- Coverage issues will emerge and take time to evolve and stabilize
- Telematics use will grow – continue the progress towards individual ratemaking
- Insurance industry should understand the issues; be prepared to adjust and innovate

Insurance & Risk?

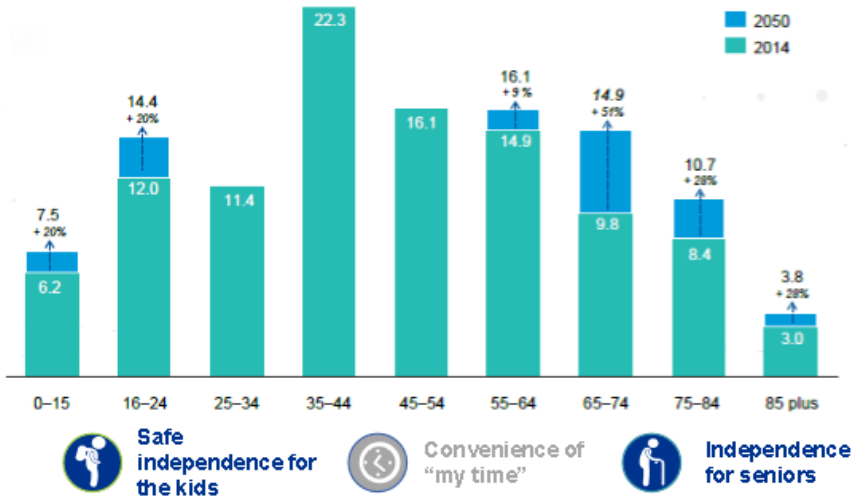
Munich RE

Understanding Personal Mobility is Critical to Forecasting Change

U.S. personal miles traveled (PMT) per capita 2014–2050 (Kmiles)

Parents can be everywhere at the same time

82 % of people asked in focus groups would want mobility options for kids



"I do not have to take keys away from dad"

79 % of people asked in focus groups would want mobility options for seniors

Note: (a) Discounted 25 percent from U.S. Bureau of Transportation Statistics (BTS) total Vehicle-miles traveled (VMT) for 1995, 2001, 2009, 2014 (assumed to be commercial miles), (b) multiplied by NHTS occupancy rates applied 2009 rate to 2014 numbers. Source: U.S. BTS data, NHTS data, U.S. Census data, KPMG Analysis

KPMG

("No parent will have to stay up fearing that awful call in the middle of the night". – John)

Florida is on the cutting edge…

FDOT ACES GUIDANCE

FDOT

AVs, CAVs, ACES: Same cards, different hands

- **A**utonomous — Capable of guiding itself with little or no human input
- **C**onnected — Having systems linked to one another and the Web to improve vehicle safety/efficiency and currently require some human input
- **E**lectric — Using one or more electric motors for propulsion and
- **S**hared-use — Vehicles used but not necessarily owned by more than one person or organization

2.25 mile oval with 70 mph design speed

SUNTRAX

Accelerating the Future of Transportation

Currently testing platooning: Structural concerns (e.g., harmonics)

SunTraxFL.com

SUNTRAX

OUR MISSION is to accelerate the future of transportation.

OUR VISION is a continuously evolving, nationally recognized center for the development of innovative transportation technology solutions.

1 Main Access & Building Facilities

- Primary entry point to the site with connectivity to all the different test zones
- Building facilities (administration, multi-bay garage, observation tower, and warehouse/lab/workshop spaces)
- Central business district environment with large reconfigurable intersection/roundabout

2 High Speed Oval

- 2.25-mile oval with a 70 mph design speed
- 1-mile independently operable 5-lane straightaways
- 4 free-flow toll gantries and office/warehouse building facilities (outside the track, not shown) for toll equipment and software testing

3 Dynamic Test Pad

- 28-acre paved open space
- Capability to replicate nearly any real-world geometric configuration in a controlled testing environment
- Accommodates virtual and augmented reality platforms to simulate countless additional scenarios (buildings, pedestrians, traffic, etc.)

4 Pick-Up / Drop-off / Multi-Modal

- Replicates various multi-modal passenger transfers, such as airports, hotels, and transit centers
- Adjustable lane striping, signing, and curb-side pick-up and drop-off scenarios

5 Urban

- Simulates a variety of urban intersection configurations and complex lighting, signing, and signalization conditions
- Highly reconfigurable facades simulating city-like buildings as well as prop features such as trees, poles, simulated pedestrians, etc.
- Facilitates "urban canyon" signal loss and simulated rainfall testing

6 Complex Suburban

- Simulates large multi-lane arterials in suburban transitional environments
- Complex configuration of multiple streets converging in a large, skewed intersection
- Adjacent frontage roads adding more conflict points

7 Roadway Geometry Track

- Undulating topography built into the manufactured hill-scape
- Strategically located to screen the entry facilities from the active test areas
- Made up of complex horizontal and vertical curves and also includes irregular grade changes

8 Environmental Test Chamber

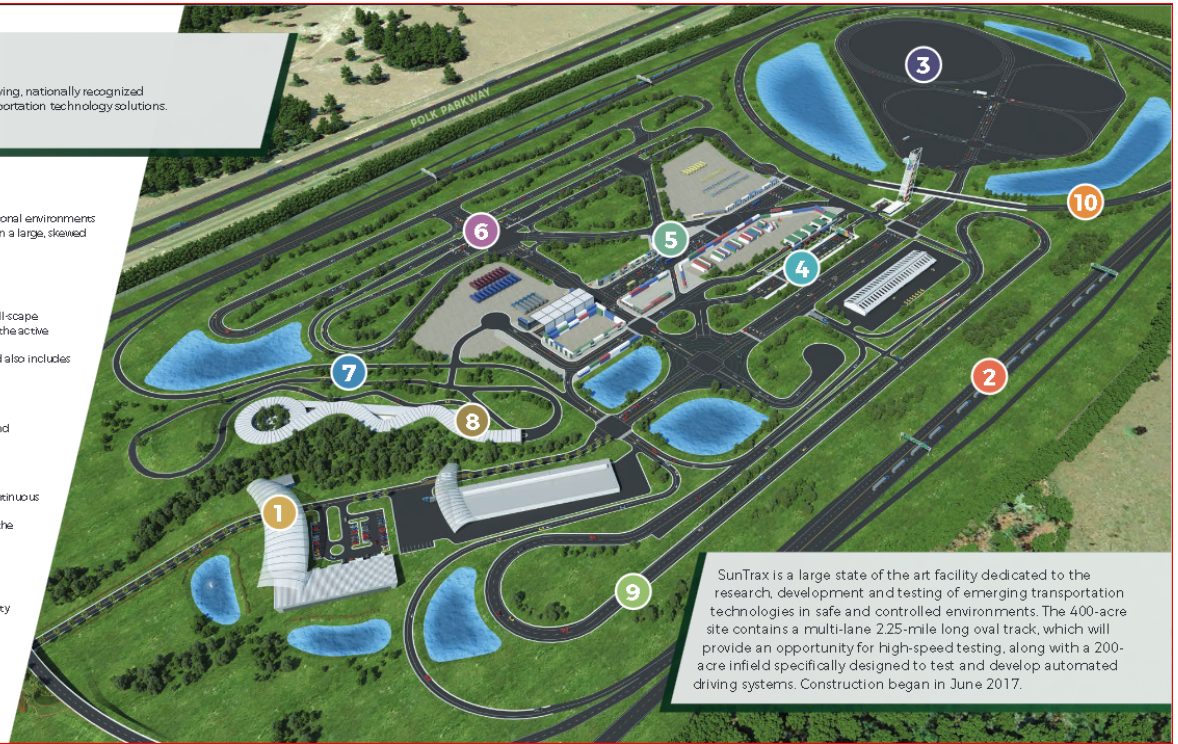
- Enclosed structure for testing in precisely controlled and repeatable smoke, fog, and dust conditions

9 Loop Track

- Straightaway track with a loop at either end allows continuous higher speed testing
- Provides a turnaround loop to feed vehicles back into the main spine road and urban grid to the west

10 Ring Track

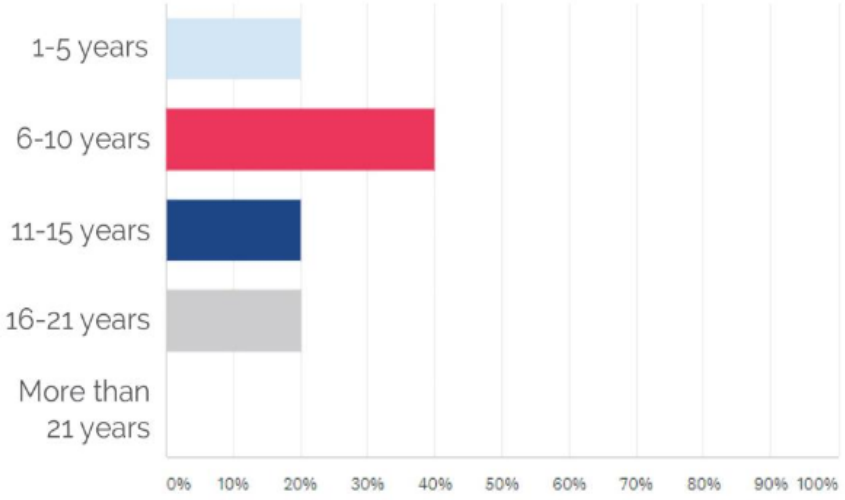
- Two-lane ring track with a 55 mph design speed
- Outer lane abutting the oval provides direct connectivity to the outer track
- Overpass over the main spine road allows continuous operations at higher speeds



SunTrax is a large state of the art facility dedicated to the research, development and testing of emerging transportation technologies in safe and controlled environments. The 400-acre site contains a multi-lane 2.25-mile long oval track, which will provide an opportunity for high-speed testing, along with a 200-acre infield specifically designed to test and develop automated driving systems. Construction began in June 2017.

ACES are coming … when?

Based on your knowledge of ACES, when do you think they will have a significant impact on your region? (select the answer that best applies)



Source: October 2017 Online Survey of Florida MPOs

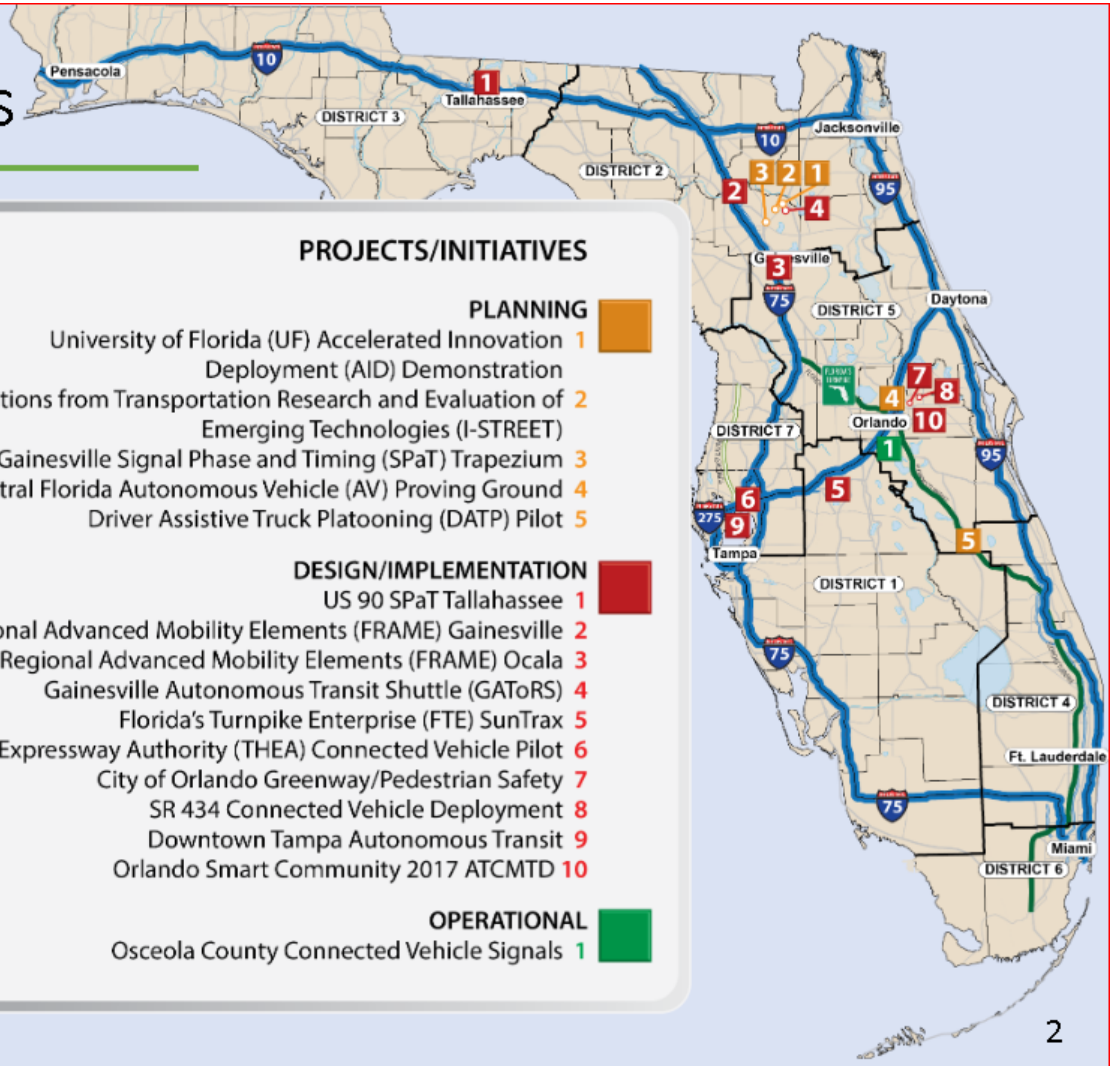
Adoption speed affected by:

- Availability
- Cost of features
- Local socio-economic factors
- Ownership and preferences
- Fleet turnover
- Needed infrastructure upgrades
- Liability & other legal issues
- Wildcard issues – social, economic, political, etc.

Florida's Connected and Automated Vehicle Initiative

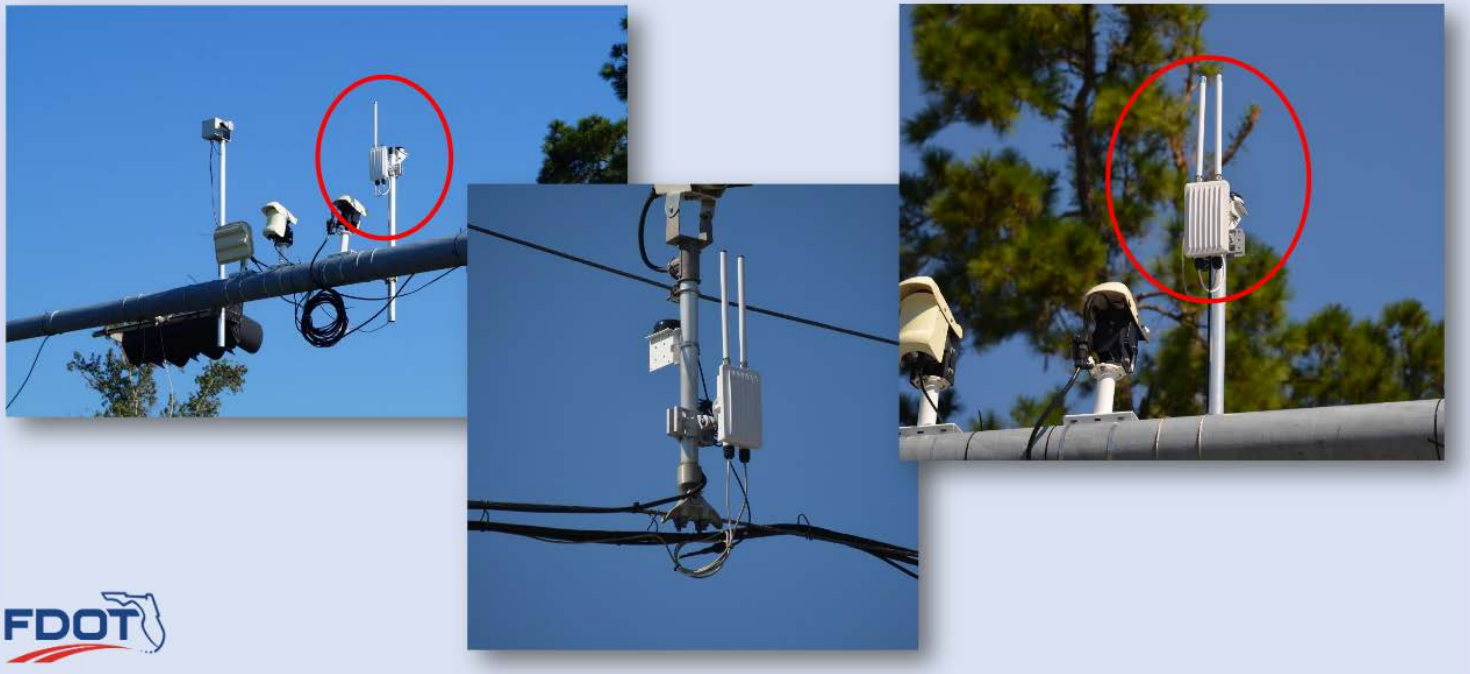
CAV Projects/Initiatives

Website:
http://www.fdot.gov/traffic/ITS/Projects_Deploy/CV/Connected_Vehicles.shtm

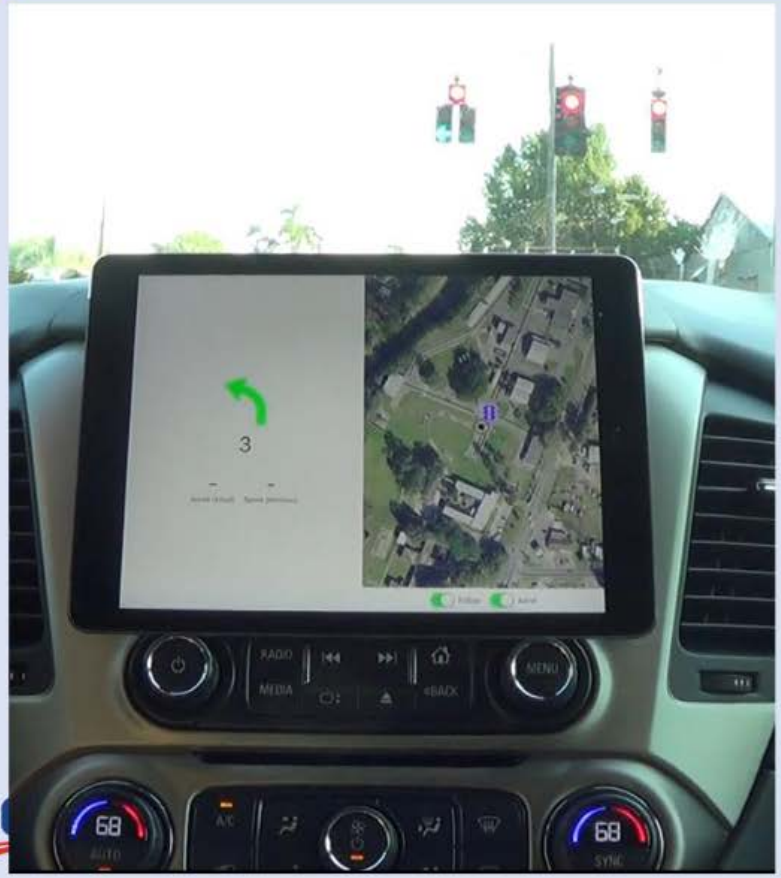


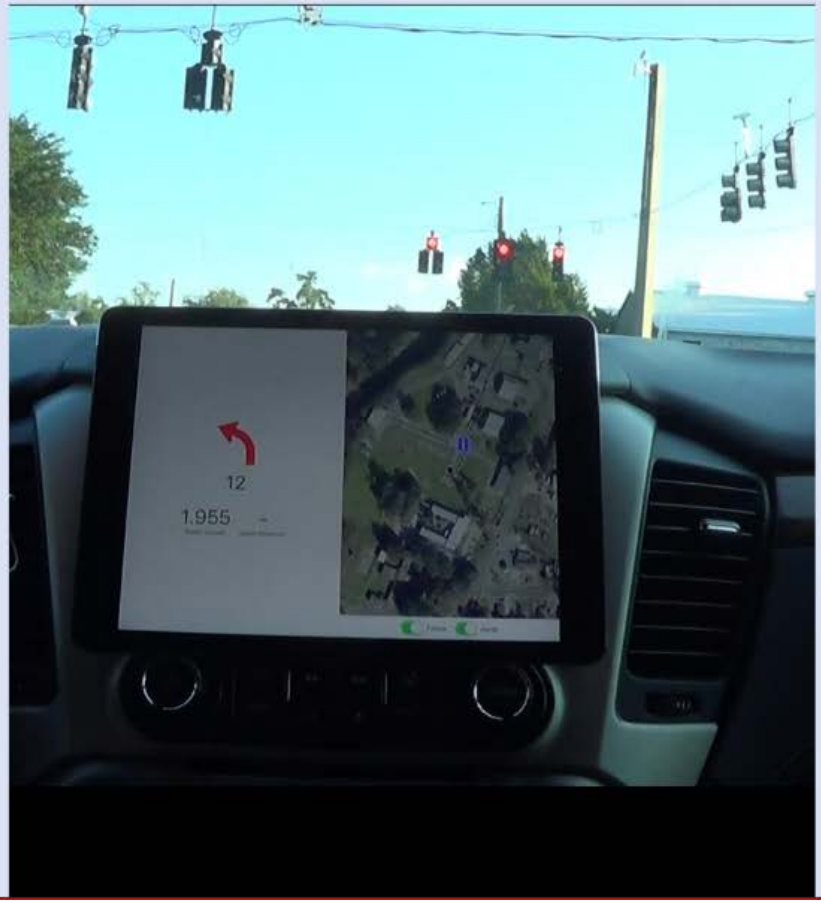
SPaT Pilot Project – Pre-Deployment Testing

Not all cameras are out to get you!



SPaT Pilot Project – Pre-Deployment Testing

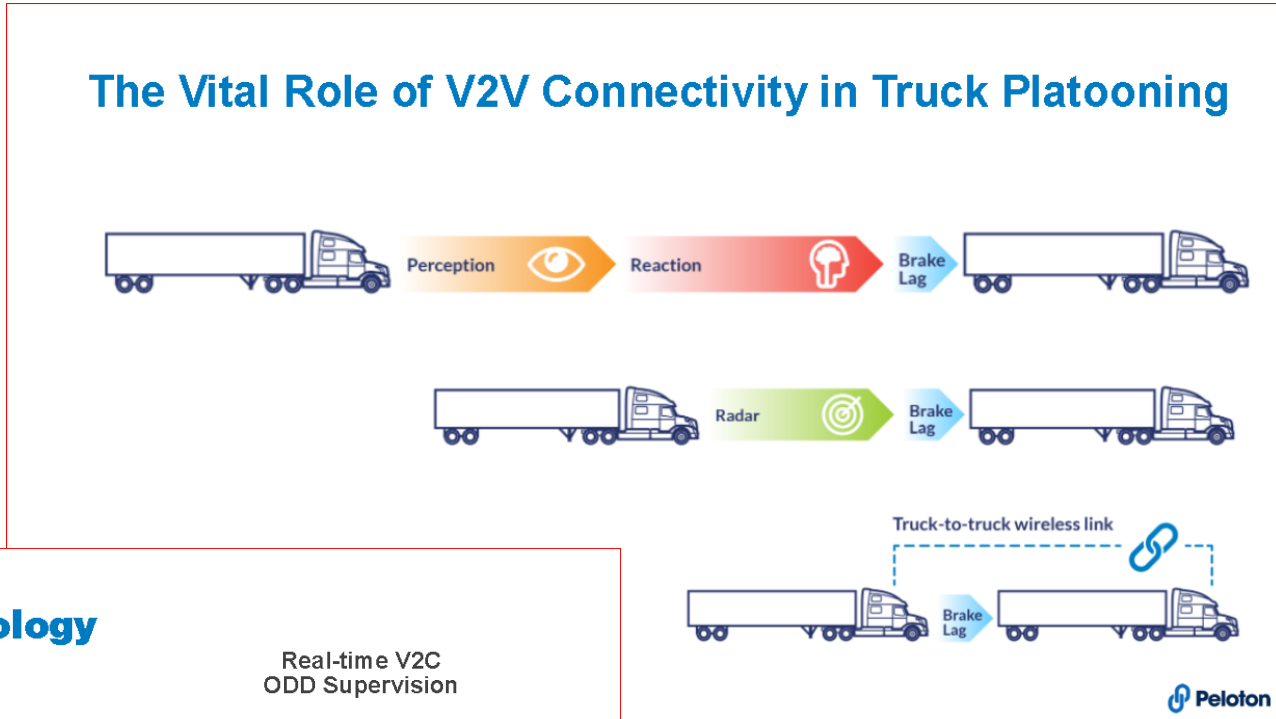


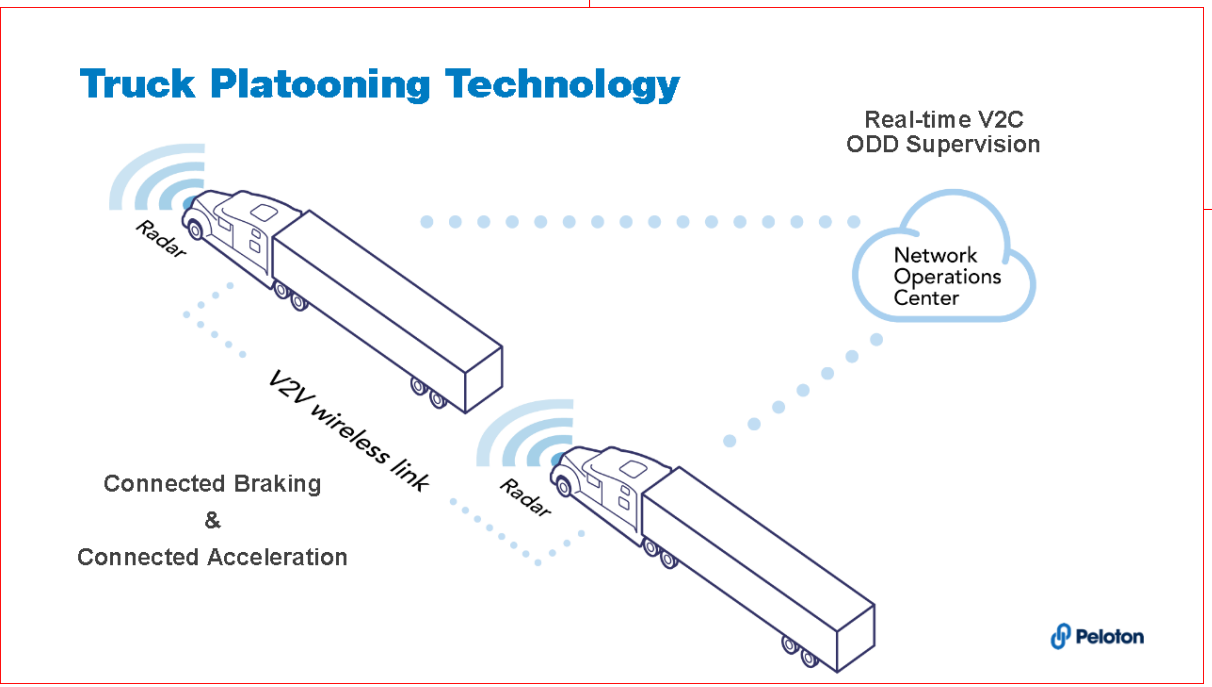


Interim measures until we reach Level 5 Automation.
SPaT integrates with vehicular devices to show the time the signal will remain green and the time remaining red.

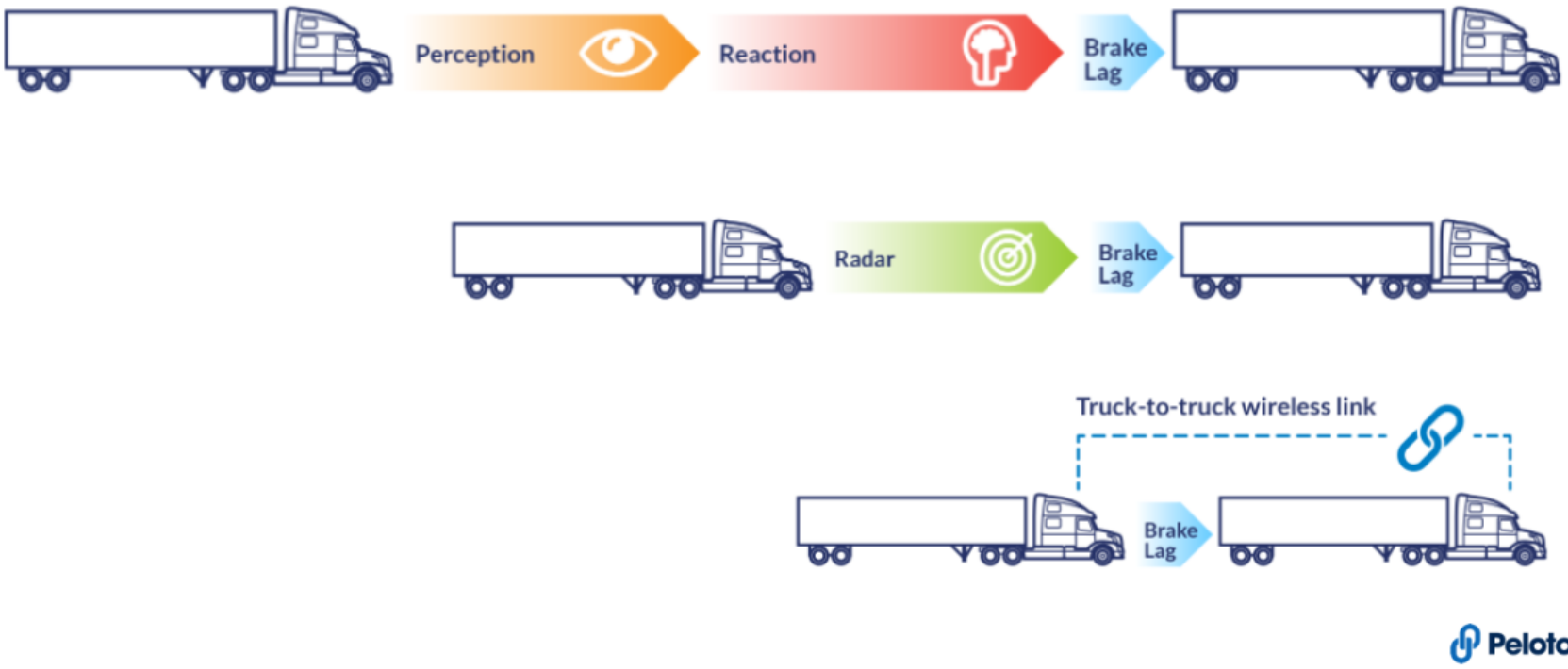
TRUCK PLATOONING

We will see real automation on our highways first in commercial and industrial applications





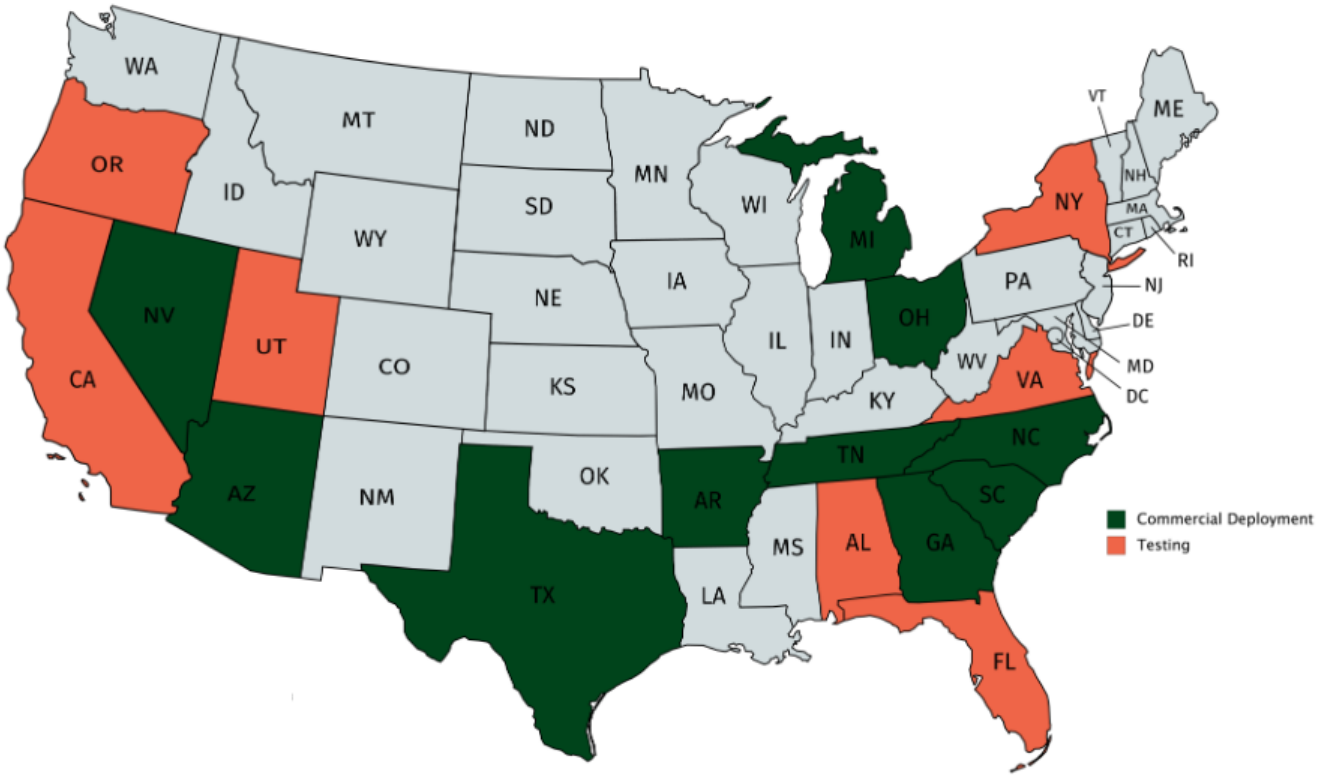
The Vital Role of V2V Connectivity in Truck Platooning



Peloton

Confirmed Allowance* of Truck Platooning

(*allowed in some form)



[Business News]

June 27, 2018 / 1:19 PM

(Reuters) - Truck maker Volvo AB (VOLVb.ST) and package delivery company FedEx Corp (FDX.N) said on Wednesday they have begun public U.S. testing of “platooning” technology, which allows digitally-connected semi trucks to save fuel by driving closely together in convoy, on a highway in North Carolina.

https://www.reuters.com/article/us-volvo-fedex-trucks/volvo-fedex-test-truck-platooning-on-public-u-s-road-idUSKBN1JN2JI

Platooning Research/Pilots/Demo's

- FHWA-funded Caltrans-PATH-Volvo testing now
  - demo in September 2017
  - 3 truck platoons
- FHWA-funded Auburn University testing
  - demo's this year
- US Army TARDEC w/Auburn University
  - Michigan>>Canada
  - Levels 1-4
  - demo in September 2017
- Texas Transportation Institute
  - 2015-2018 program
  - Level 2 platooning
  - pilot tests to assess impacts on infrastructure, operations
- Florida
  - Platooning Study:
    - Florida DOT
    - Dept of Highway Safety and Motor Vehicles
    - Florida Highway Patrol
    - Florida Turnpike
  - Pilot testing 2017-18
    - evaluate use and safe operation

Implications for Real Estate and Land Use

Land gains and redevelopment opportunities

- From roads (smaller and more efficient ROWs)
- From parking lots and structures
- From buildings and uses no longer needed (car lots, gas stations, convenience stores?)

Building design and placement

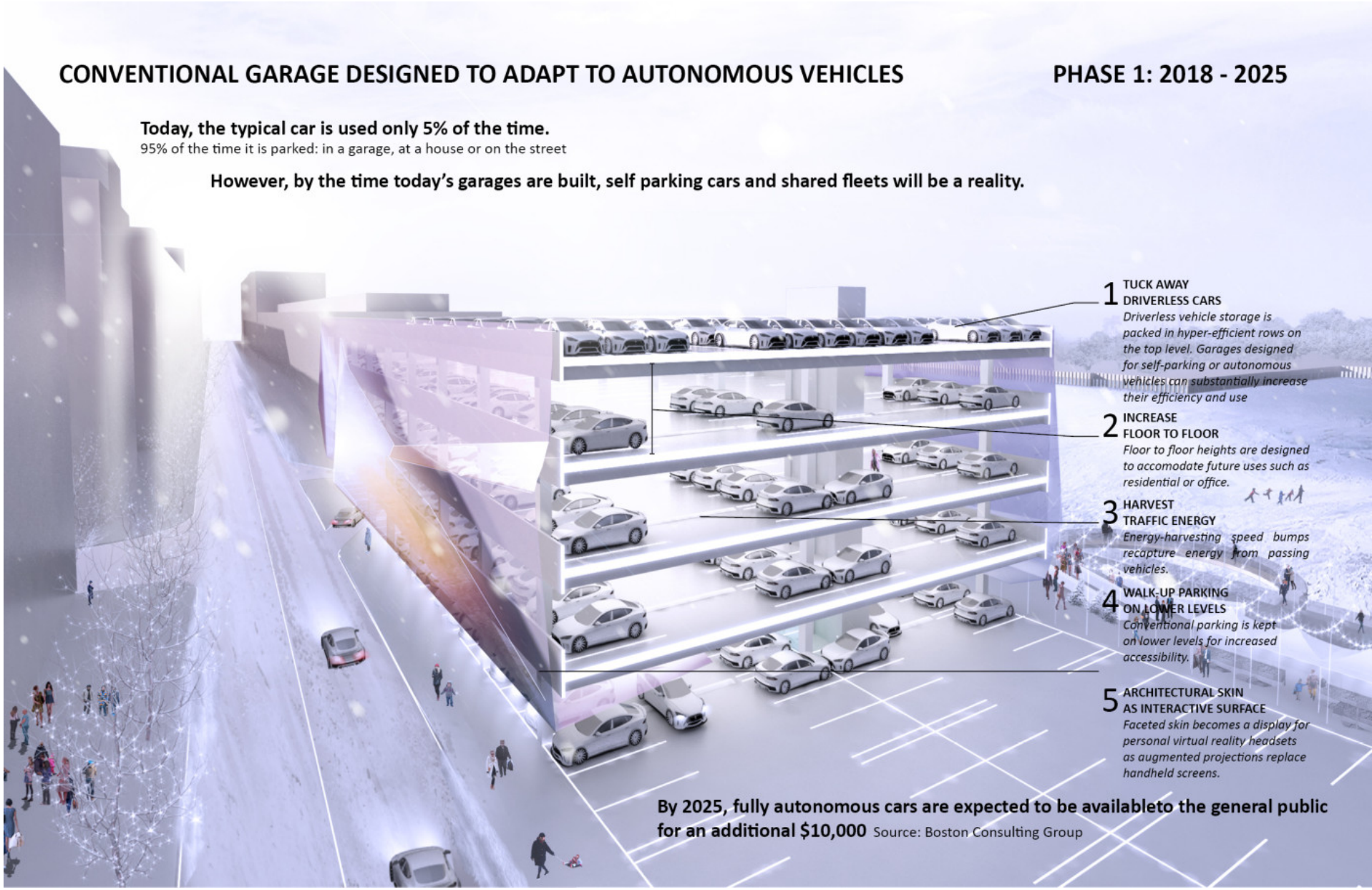
- Drop-off and Pick-up
- Placement and facing on property
- Relationships between buildings

Urban design and planning

- Bicycle, pedestrian and small vehicle orientation
- Signage and signalization revised
- Public facilities reoriented

Other … *(discussion)*

REAL ESTATE Development and Technology



REAL ESTATE Development and Technology

SAUL EWING
ARNSTEIN
& LEHR LLP

- **HYPERLOCAL URBAN RESOURCE CENTER**
- ✓ 25-feet wide, lot line-to-lot-line construction
- ✓ 40 stories tall
- ✓ 2,950 sf
- ✓ Replaces 135,000 sf horizontal DC and increases productivity 75%
- ✓ Ground floor retail/e-commerce fulfillment and returns
- ✓ Middle floors for additive manufacturing and final assembly
- ✓ Vertical ASRS
- ✓ Glass exterior with embedded LED arrays
- ✓ Hypervelocity docks
- ✓ AGV charging support
- ✓ Micro-depot and delivery lockers
- ✓ Remote control center
- ✓ Multi-level aquaponic farm with 500-ton annual growing capacity
- ✓ Roof-top tilapia fish tanks: generate nitrates

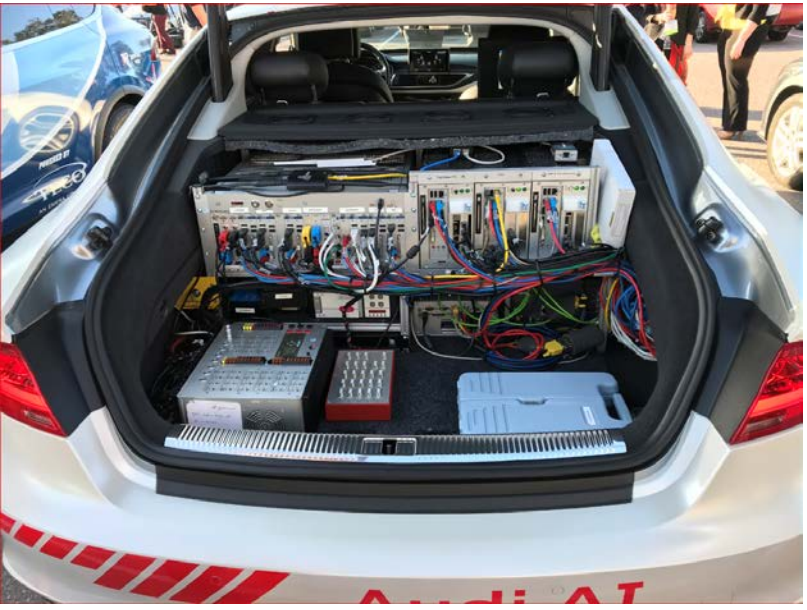
SAUL EWING ARNSTEIN & LEHR LLP

2017 Florida Automated Vehicles Summit

Fifty years from now kids will ask their grandparents:

"Gramps, did they really let regular people drive 4,000 pound wheeled boxes around, right at each other, at 100 kph?"

FLORIDA AUTOMATED VEHICLES



"A kid in Africa, walking around with a smart phone, is talking to the cloud and has access to millions of computers, to all of human knowledge with a few keystrokes. We can't to that through our brains; we do that through these devices. But by the 2030s little [implanted] nanobots will connect our neo cortex directly to the cloud".

- Ray Kurzwel, eMerge 2016

www.saul.com

Link to the 2017 Florida Automated Vehicle Summit Presentation PowerPoints and Audio: https://favsummit.com/2017-presentations/

Registration link to the 2018 Sixth Florida Automated Vehicle Summit: https://favsummit.com/
November 27-28, 2018 in Tampa, Fl.

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