C/AV for Agencies 101

Transportation Planning Considerations for Connected and Automated Vehicles

Connected & Automated Vehicle Workshop
Rancho Cordova, CA

presented by
Mark Jensen

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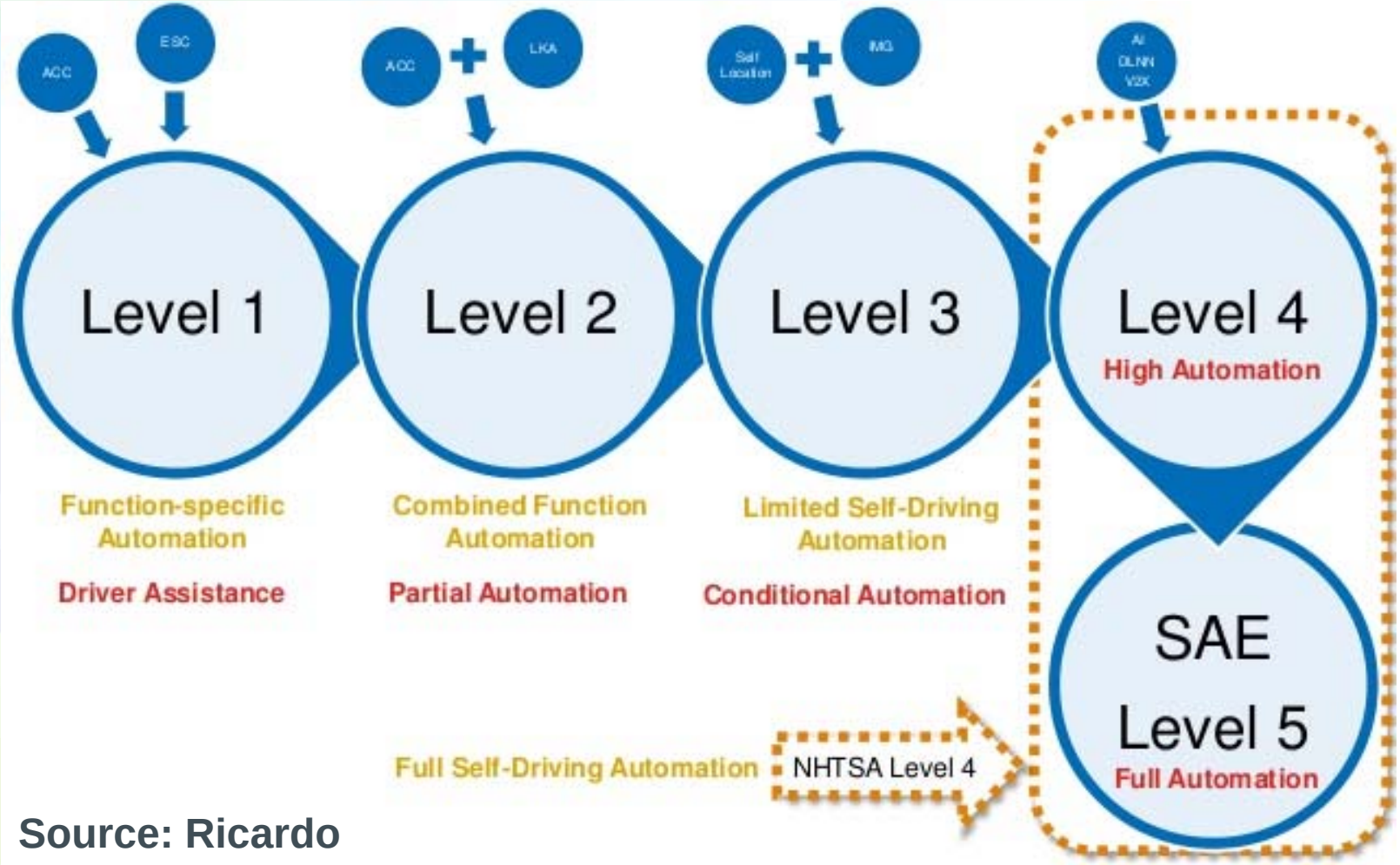
Think Forward

January 17, 2018

Every week we hear a story in the news about connected vehicles, automated vehicles, or self-driving cars and how these vehicles will transform mobility in the United States.

Definitions

Automated Vehicle Technology



Source: Ricardo

Ready or Not – Elements of Automated Vehicle Functionality Have Already Arrived

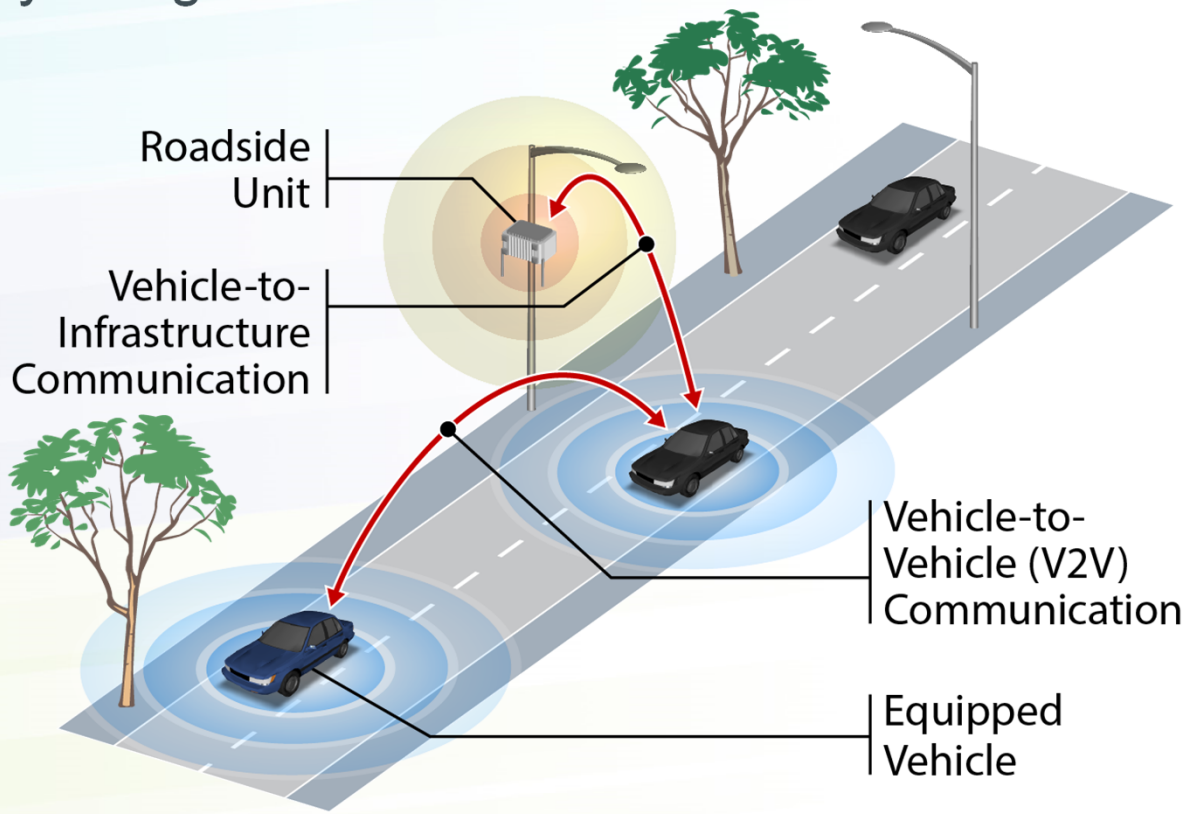
While driving to work, Joshua Neally began to suffer severe chest pain. He had pre-programmed the nearest Emergency Room into Tesla's Autopilot software, and by selecting that location, the car navigated 20 miles of highway for him, and he was able to re-take control near the exit, and make it to the ER.

Source: Green Car Reports

Definitions

Connected Vehicle Technology

Connected Vehicles (CVs): technology that provides driver assistance functions by using wireless communications with other vehicles and infrastructure to gather information about their environment.



Overview of CV technology

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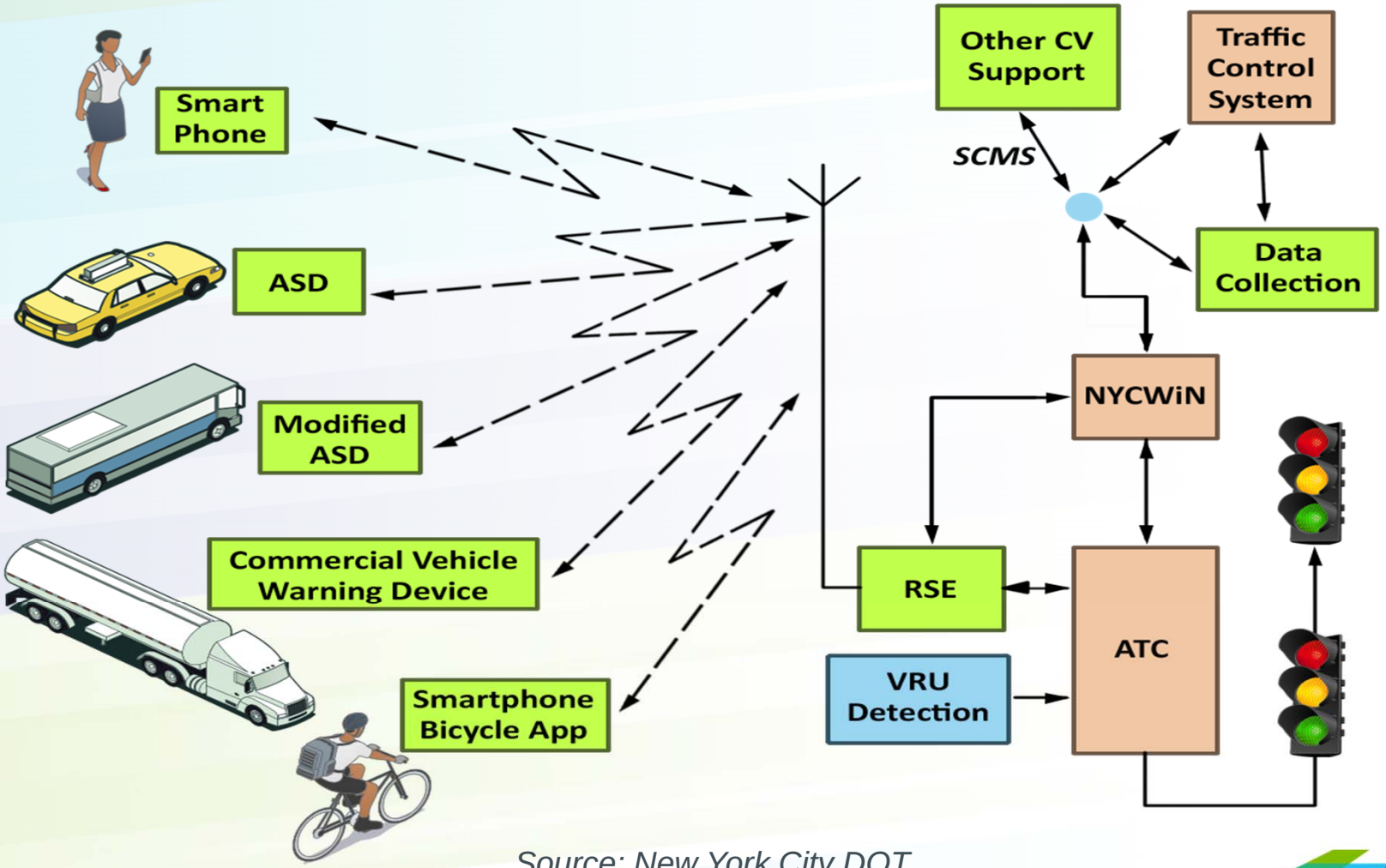
Development and Deployment of Connected Vehicle Technologies



Source: New York City DOT

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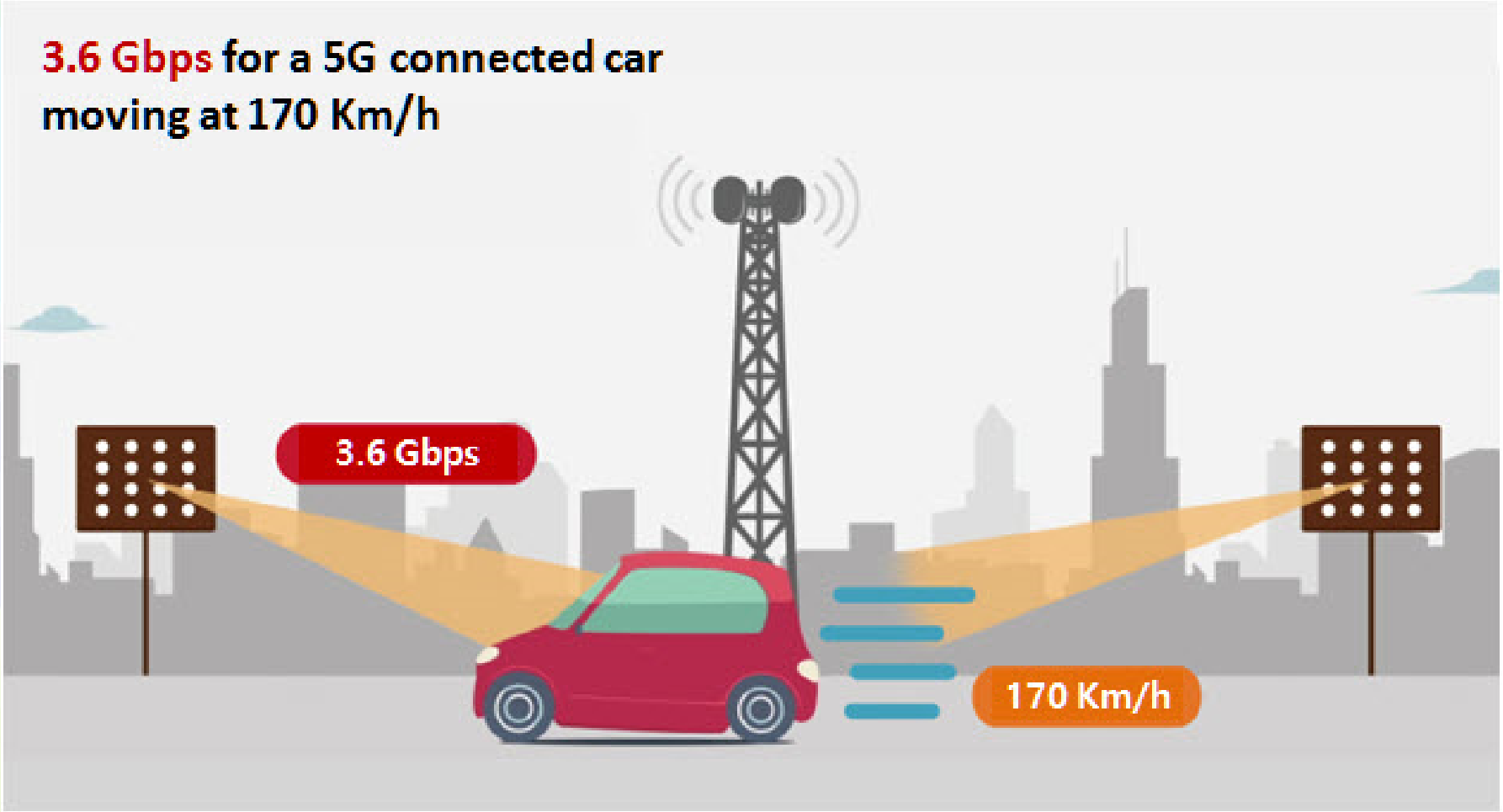
Connected Vehicles: The 5G Option



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Don't get caught up in choosing sides or thinking one way is better than another.

The Future will be

Connected

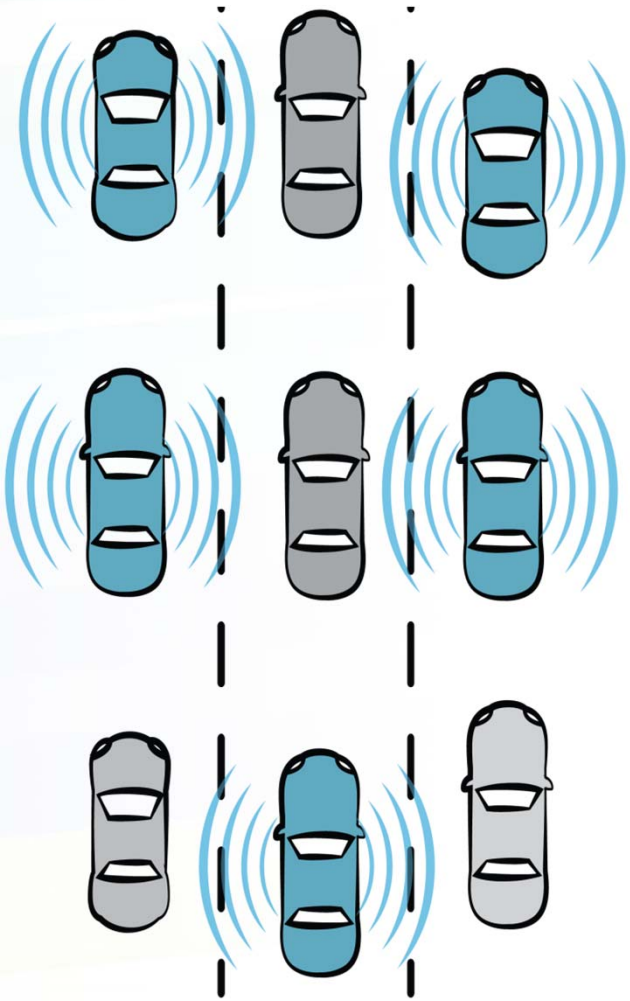
AND

Automated

(C/AV)

When the majority of the fleet is both connected and automated, there will be significant decreases in crashes, resulting in significant increases in safety and reliability.

Vehicle spacing on roadways will be safely reduced on a large scale



Capacity Expansion Could Be a Thing of the Past

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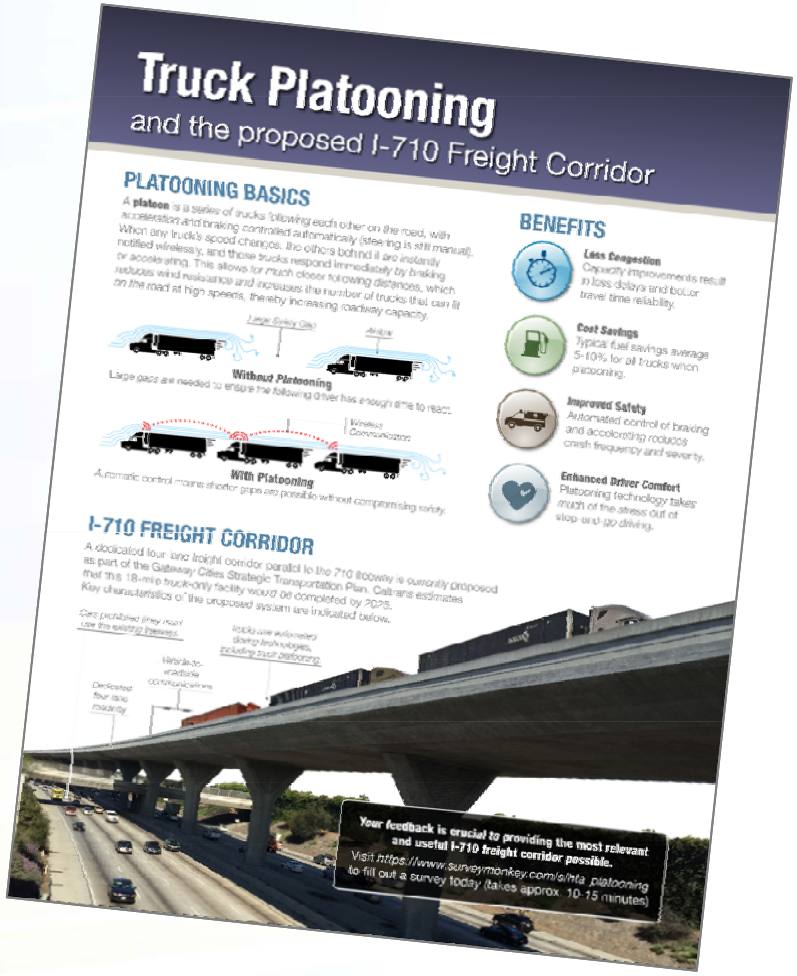
Example of C/AV Planning – CA Truck Platooning

Planning for the I-710 Dedicated Truck Lanes

- Project Lead: LA Metro & Gateway Cities COG
- Connected Corridor from ports to downtown LA
- ConOps and Corridor Plan
- 710 Corridor Simulation Modeling for C/AV Dedicated Truck Lanes
- Project list and long-term Implementation Plan



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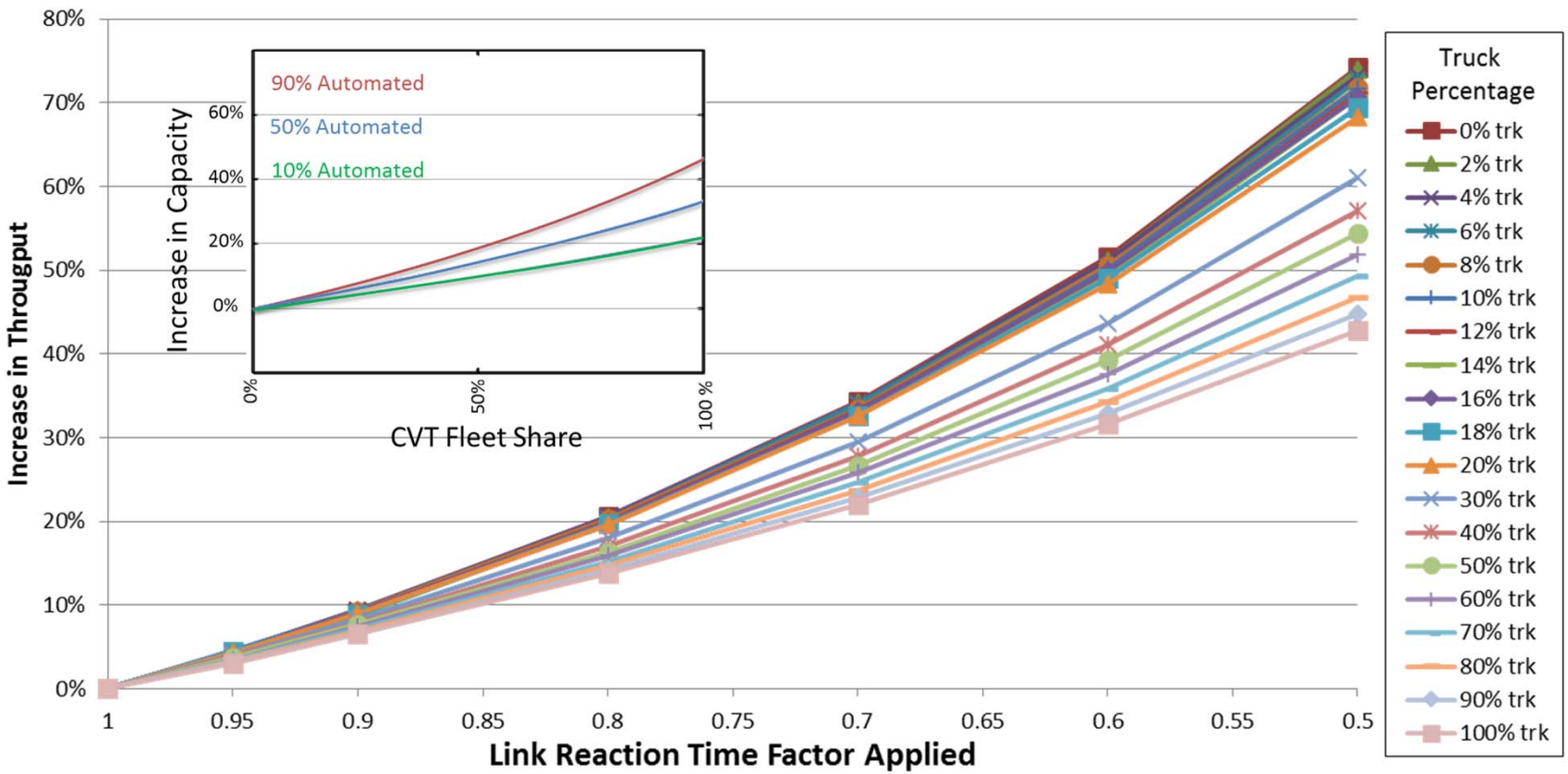
Example of C/AV Planning – CA Truck Platooning

I-710 Dedicated Truck Lanes Impact



- Mesosimulation: CV effects simulated using adjustments to saturation flows (capacity).
- Different factors used depending on facility type and CV strategy being considered.

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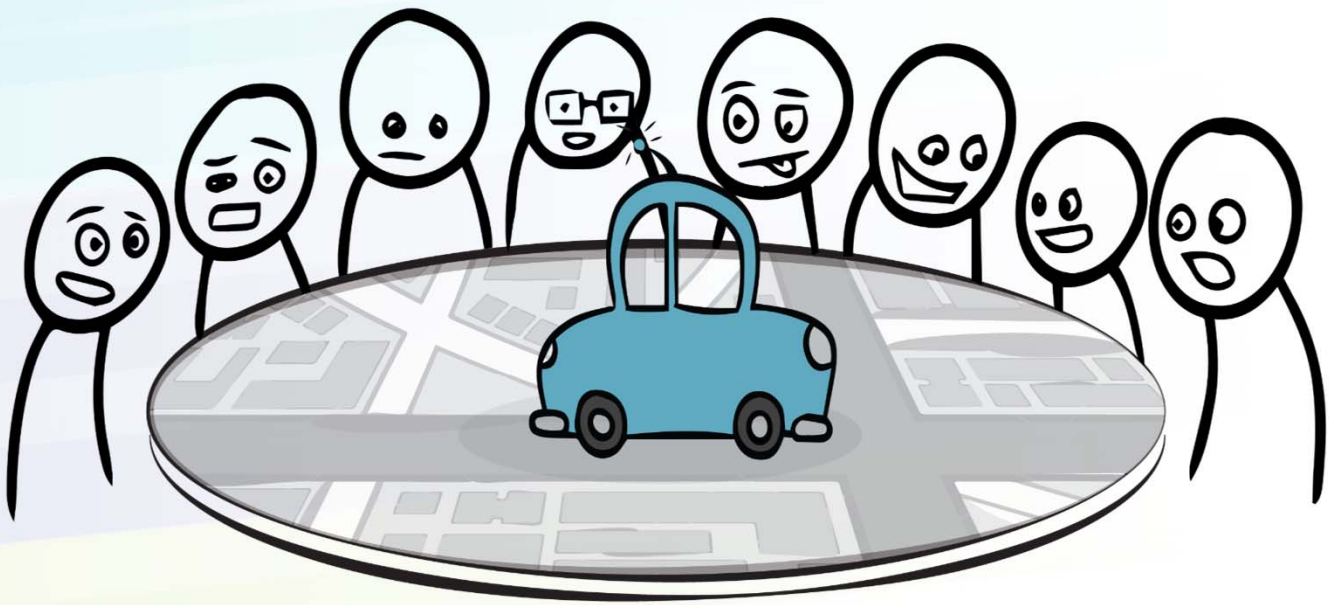
Example of C/AV Planning – CA Truck Platooning

Legislative Changes for C/AV

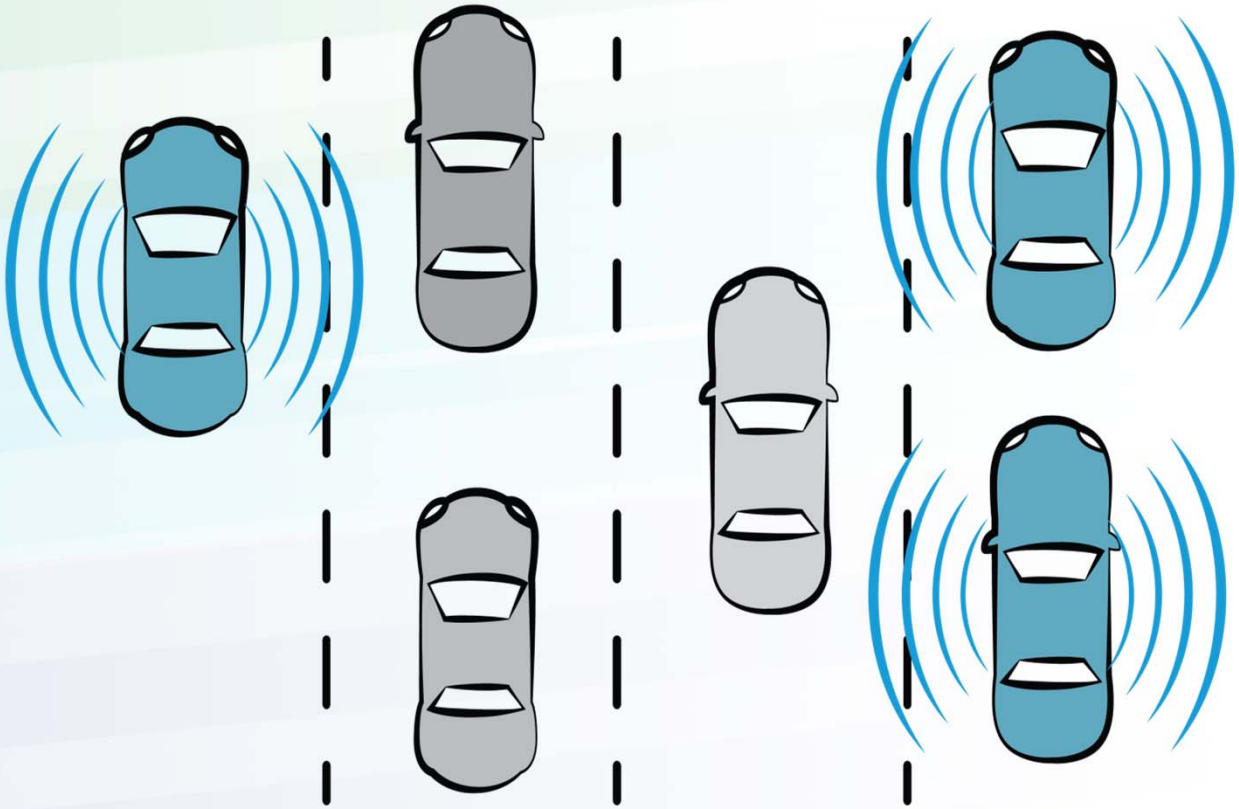
- Many states have "Anti-Convoy" laws that preclude truck platooning
- California's Anti-Caravanning Law requires a minimum spacing of 100 feet.
  - Law was recently amended to allow for shorter headways for testing purposes only

Source: Oshkosh Northwestern

What do we need to examine as we develop planning scenarios today...

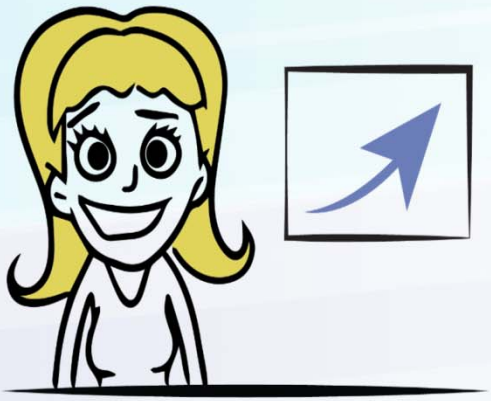


about these vehicles of tomorrow.

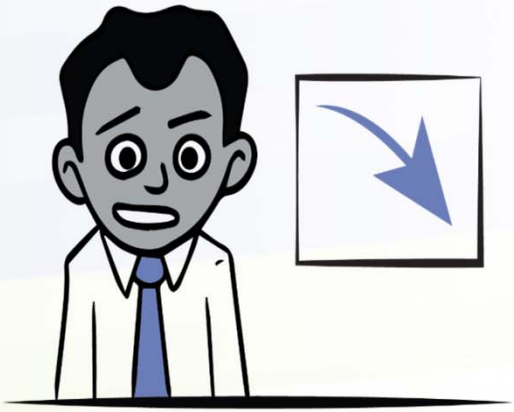


Now is the time to start developing new forecasts
Based on these vehicles being in the fleet.

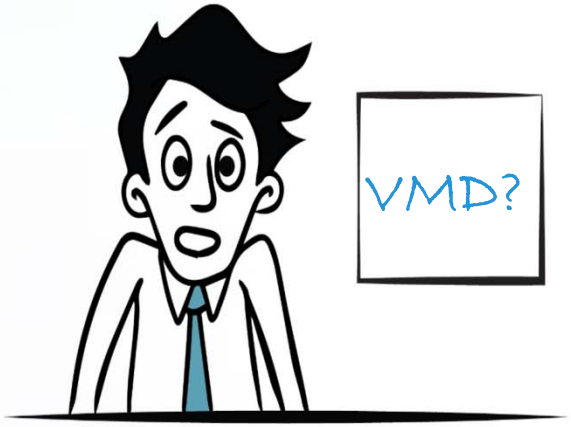
But there are conflicting predictions:



Some say
VMT will go up...



Some say
VMT will go down...



And some folks are now
talking about VMD...

Tomorrow:
VMT ≠ VMD

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Phillip Rivers Example

Three days a week, for every week during the NFL season, Rivers "works" from the back seat while his driver delivers him from his home to the Chargers' facility in Costa Mesa.

"An hour and 18 minutes, which is nothing" - Rivers

And we need answers to several major questions:

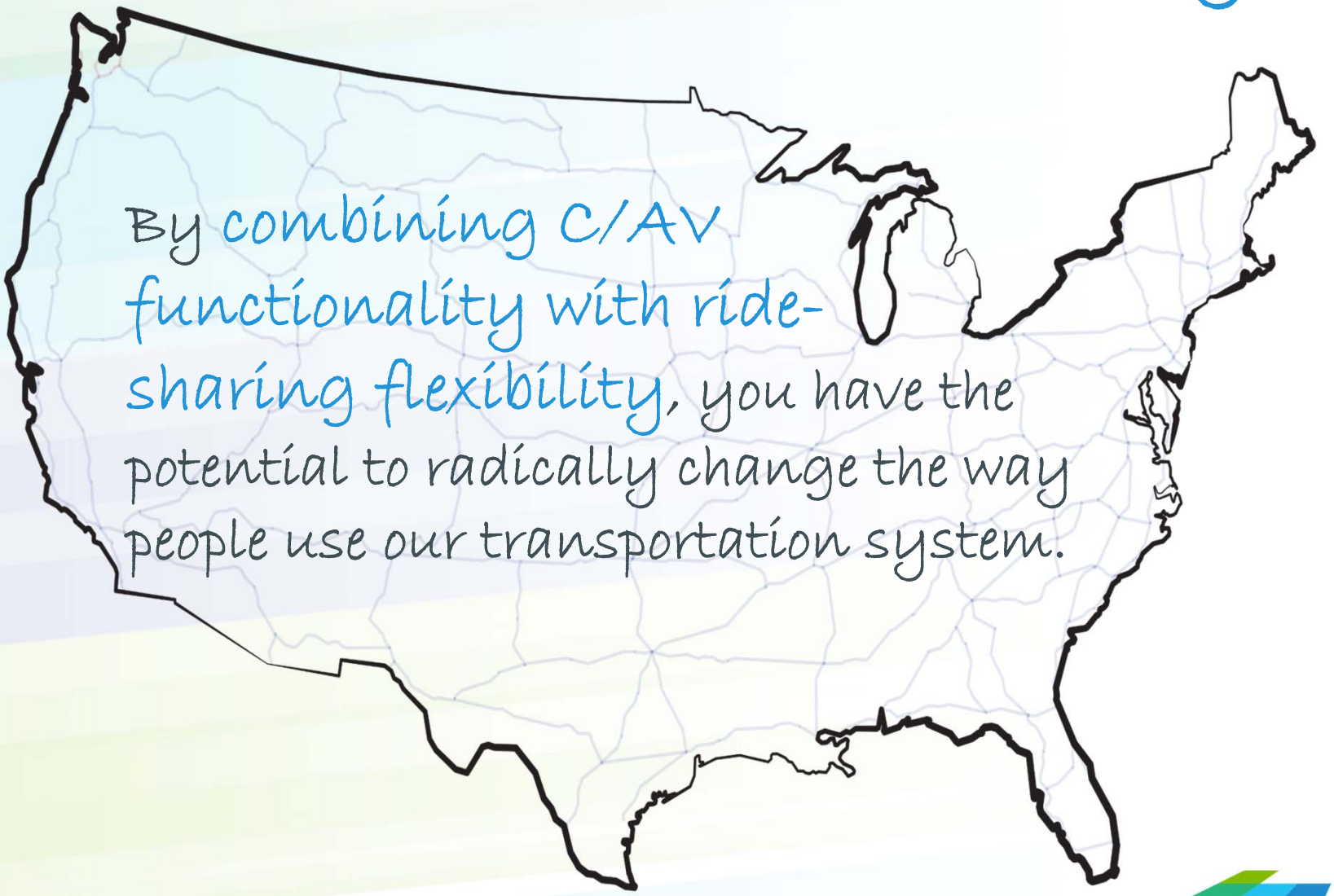
How do we plan for **MIXED** vehicles in the mid-term

What happens to **TRANSIT?**

How will **LAND USE** change?

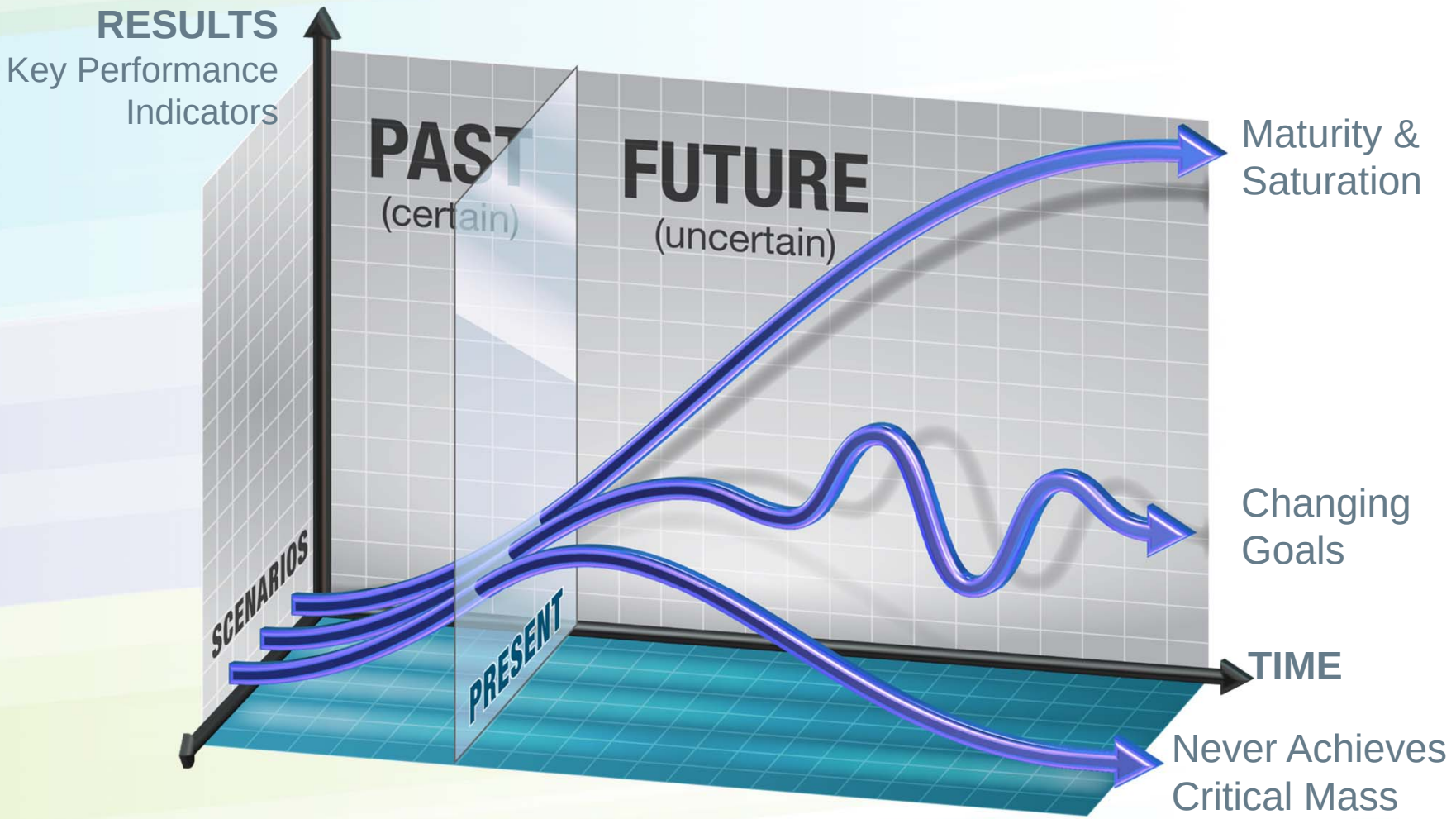
How do we need to **UPDATE** our modeling techniques to better capture the **IMPACT** of these **VEHICLES?**

And we must also take into account the emerging Shared Economy



By combining C/AV functionality with ride-sharing flexibility, you have the potential to radically change the way people use our transportation system.

How do we develop future C/AV Scenarios Given all the uncertainty?



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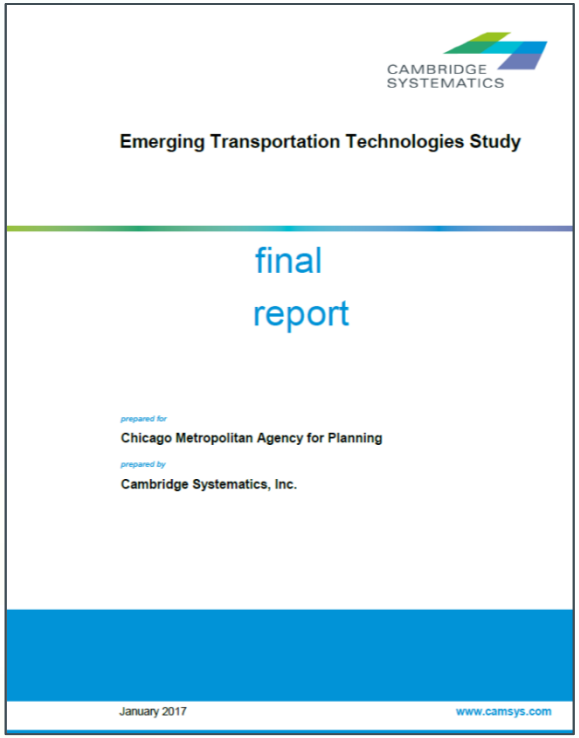
Robust Decision Making C/AV Strategies Example

Robust Strategies for the Chicago Region for Automated Vehicles

- Near-term (NT)
  - Supportive policies for shared mobility
  - Advance existing ITS strategies into AV usage
- Shaping (S)
  - Pricing options for AV roadway use and parking in denser urban areas
  - Infrastructure to promote shared mobility, and continued investment in transit
- Hedging (H)
  - Hedge against VMT increases caused by AVs, by maintaining a dedicated ROW for shared vehicles
- Deferred Adaptive (DA)
  - Dynamic pricing to encourage capacity utilization
  - Integrating fleet of mid-size AV transit vehicles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Emerging Transportation Technologies Study

final report

prepared for
Chicago Metropolitan Agency for Planning
prepared by
Cambridge Systematics, Inc.

January 2017 www.camsys.com

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C/AV Strategic Planning Example

- Virginia AV Strategic Plan Example
  - Formed stakeholder groups (internal and external) to address core functional areas
  - Strategy-driven approach using RDM
  - Engaging private sectors partners through workshop and charrette

Statewide AV Needs: Functional Areas

- Traffic Engineering and Operations
- Driver Licensing and Vehicle Registration
- Transportation Planning
- Data Management and System Security
- Capital Investment
- Vehicle Sales Oversight
- Vehicle Inspection and Commercial Vehicle Regulation
- Public Transportation
- Non-Motorized Transportation
- Research
- Vehicle to Infrastructure Technology Deployment

USDOT Primer on C/AV Impacts on Agency Planning Products and Processes

Connected Vehicle Impacts on Transportation Planning

Primer

www.its.dot.gov/index.htm
Final Report—June 2016
FHWA-JPO-16-420

U.S. Department of Transportation

https://ntl.bts.gov/lib/60000/60200/60240/FHWA-JPO-16-4201.pdf

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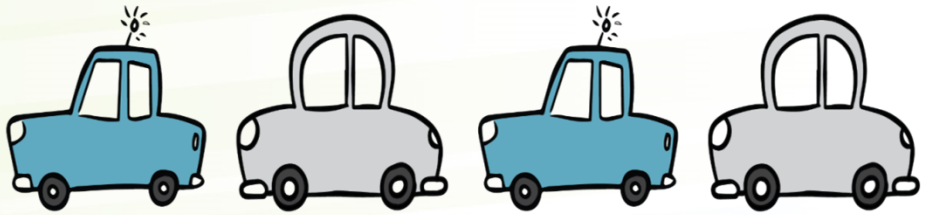
Conclusions: Some questions that must be addressed in C/AV Planning

- Will capacity improvements from CAV reduce need for physical expansion on major freeway corridors?
- What polices and regulations are needed to mitigate the potential for unforeseen consequences of new traveler behavior that could substantially increase VMT?
- Will roadway configurations have to change during the period of mixed fleet operation? (e.g. separation of automated and non-automated vehicles)
- Will AV replace or supplement some transit services?



Thank You!

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