Readying our Roads & Cities for Connected & Autonomous Driving:

NEWBITS FINAL CONFERENCE – MARCH 21, 2019

Building Partnerships

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Why cooperation matters

Many of the trends – demographic & technological – driving transport demand can be projected to 2030 and beyond. It is our ability to design policies supporting C-ITS ecosystems that will determine their "real world" impacts:

- ✓ **Business-as-usual**: transport systems continue to be managed as they are today. Congestion and GHG emissions rise as a function of population.
- ✓ **Unconstrained autonomy**: autonomous mobility hits the roads faster than the policies needed to guide them. Many projects fail or trigger unintended consequences (e.g. robo-taxis increasing urban congestion).
- ✓ **Seamless mobility**: governments actively prepare for AVs, by setting standards and goals for efficiency, safety & connectivity.

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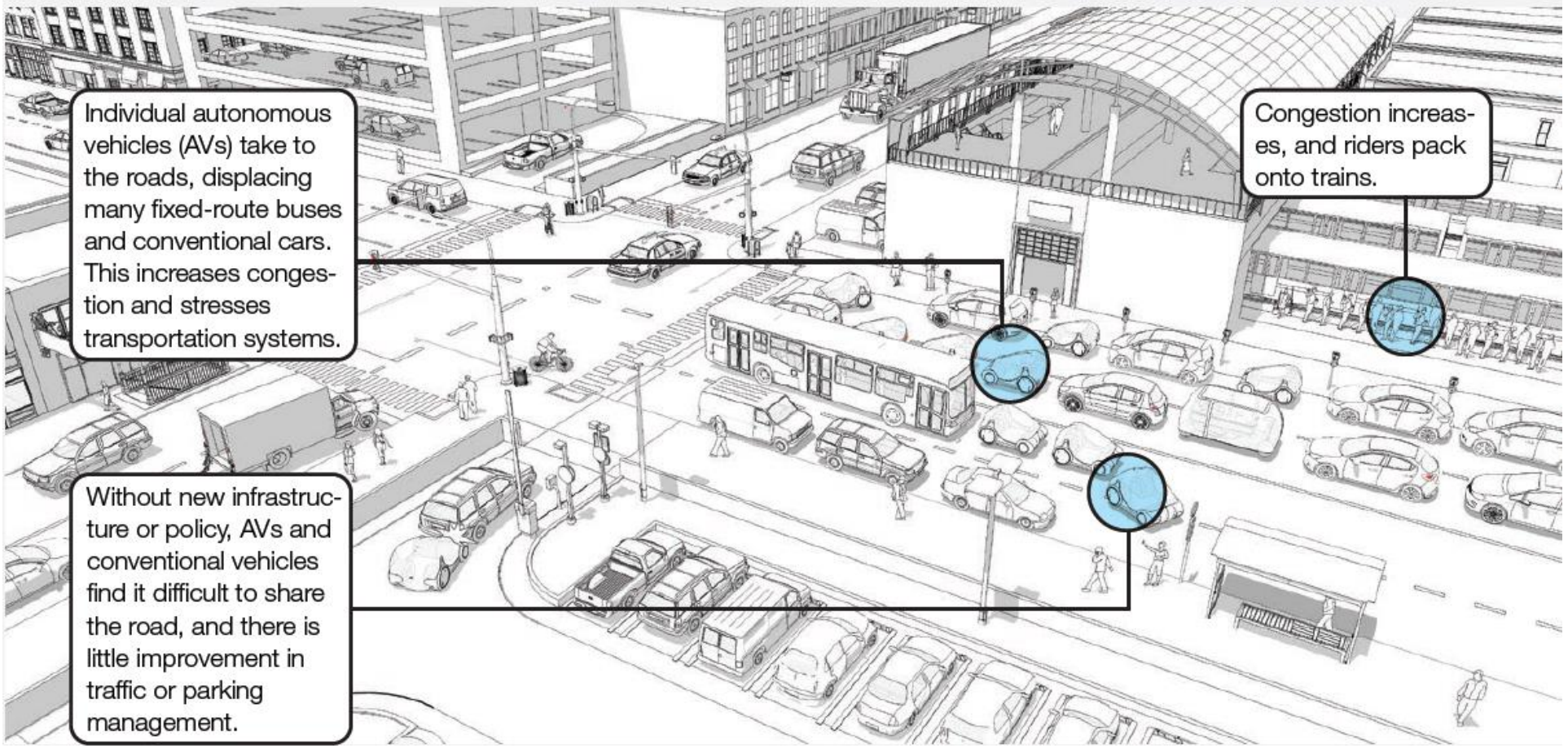
Business as Usual Scenario

“Unconstrained autonomy” scenario



Source: McKinsey Center for Future Mobility

Which of these gets the most attention?

“The future of cars is linked to the future of roads”

Policy (and media!) focus on speed of deployment of CAVs, but roads are the critical and universal platform on which these systems all need to operate.

Long transition time to full adoption of CAV. Given the average age of the fleet, many vehicles purchased in 2019 will still be on the road in 2030.

Pacing the Industries

Can the highway infrastructure industry keep up with the pace of technology and vehicle automation?

- **Technology pace**: First iPhone was announced 11 years ago. There is an update every year. How old is the phone with you today?
- **Vehicle pace**: How old is the vehicle you drove (or that drove you) to this meeting?
- **Infrastructure pace**: Generally designed for a 30-year life span

Where do we begin?

- US FHWA recently completed a Request for Information on integrating automated vehicle needs into the highway system

- Number 1 finding:

  Greater uniformity and quality in road markings and traffic control devices would enable automation. Having greater consistency in road markings and traffic control devices and an improved state of good repair benefits all road users, including automated driving systems.

Examples of Auto Industry Requests

- Uniform marking applications:
  - Dotted lane line extensions at exit and entrance ramps
  - Intersection turn markings
  - HOV and other special lane designations
  - Crosswalk markings
  - Eliminate ceramic buttons
- Good state of repair:
  - Higher maintenance standards for markings
  - Wet-night performance
  - 6-inch wide markings
  - Longer skip lines
  - Less confusing marks/scars/joints on the roadway surface

Evolving Policies: in CA

Caltrans®

Staying in Your Lane Just Got Easier

Wider, Brighter, Longer-Lasting Road Striping To Help Drivers Today, in Future

Caltrans' new, 6-inch-wide, highly reflective road striping was introduced on Interstate 80 through Sacramento as part of a statewide effort to restripe the 50,000-plus lane miles of state highway system in the next decade.

Motorists in many areas will notice the difference that the higher-profile striping makes on their driving experience. The new road demarcation lines, which consist of tape or thermal plastic embedded with glass beads, are replacing the longtime standard 4-inch-wide stripes.

Also disappearing, as the new striping is laid, are the raised, non-reflective pavement markers known

A section of new-generation road striping was recently laid on Interstate 5 near Orland, about two hours north of Sacramento.

"The new striping, with its wider and brighter profile, is expected to enhance safety for older drivers and truckers, and in challenging conditions such as rain. It also will be a better roadway guide for autonomous vehicles. ***Caltrans has consulted with Tesla and Google, two major players in the autonomous vehicle industry, about the striping changeover."***

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Evolving Policies: in Europe

Proposal for a Directive amending 2008/96/EC on road infrastructure safety management

1. Member States shall ensure that road markings and road signs are properly designed and maintained in such a way that they can be easily and reliably recognized by both human drivers and vehicles equipped with driver assistance systems or higher levels of automation.

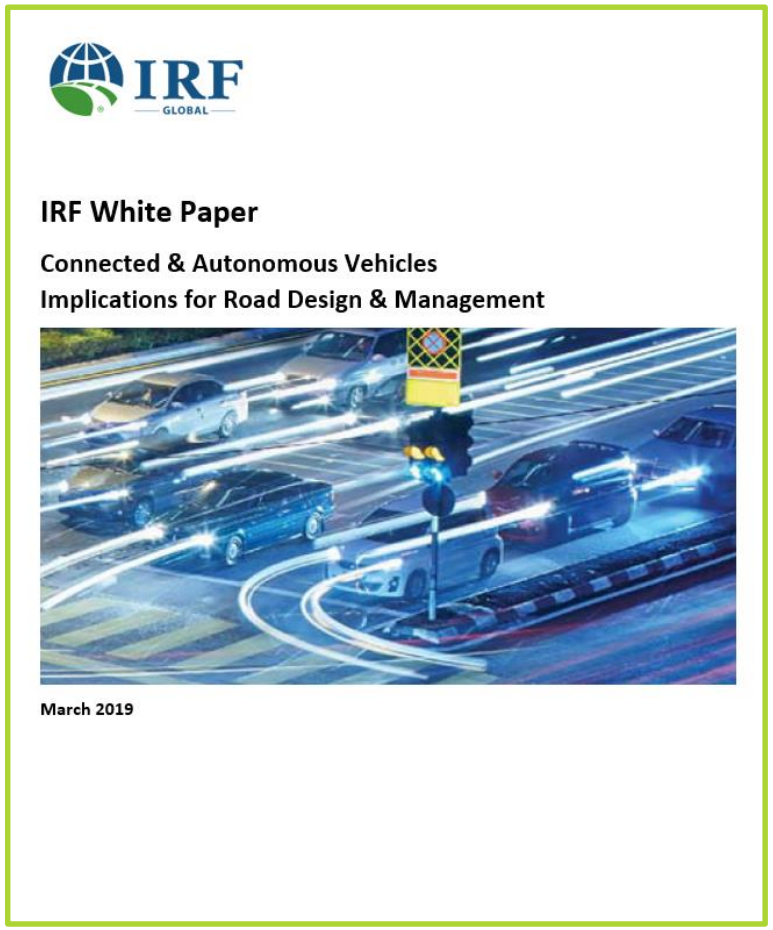
2. The Commission shall develop general performance requirements to facilitate the recognition of road markings and road signs.

Main Take-Aways

As road markings example demonstrates, it is possible to make targeted adjustments to road design standards, when they are backed by clear scientific evidence.

It is much more complex to require road agencies to pay for these upgrades and for the resulting monitoring activities to ensure that safety-critical performance is continuously met.

Coming Soon



Contributions wanted!

Tom Antonissen
Senior Advisor, Europe
tantonissen@irf.global

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International Road Federation

Better Roads. Better World.