CSN Children's Safety Network

EDC Education Development Center

January 26, 2022

2:00 p.m.- 3:00p.m. ET

Keeping Kids Safe in Automated Vehicles: Key Considerations

Moderator

Cindy Rodgers

Project Specialist
Children's Safety Network

Funding Sponsor

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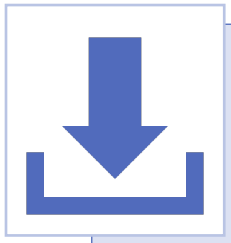
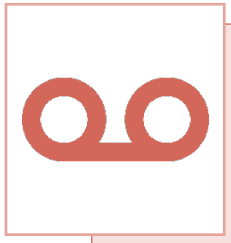
You are muted



Download resources in the File Share pod (above the slides)

Use the Q & A (bottom left) to ask questions at any time

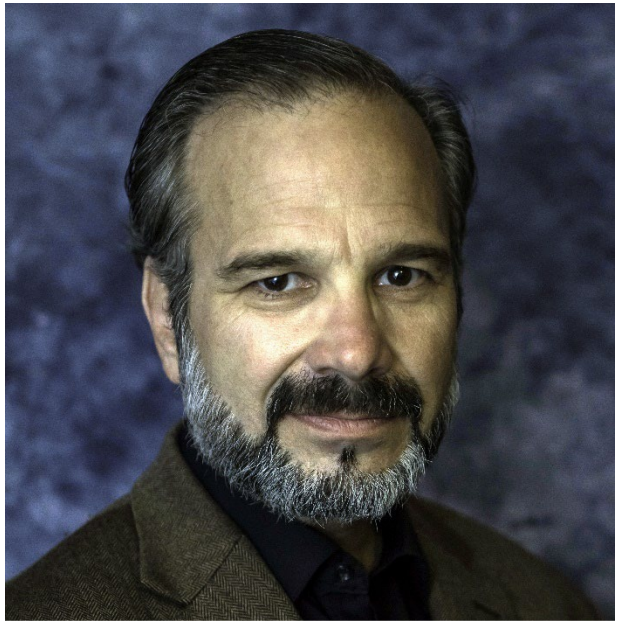


This session is being recorded

Speakers

Kristy Brinker Brouwer

Professor of Mechanical Engineering
Kettering University



Joe Colella

Director of Child Passenger Safety
Juvenile Products Manufacturers Association

Keeping Kids Safe in Automated Vehicles

Key Considerations

Blue Ribbon Panel Report

AV Developer Call to Action

Acknowledge children are not small adults and require special developmental consideration:

- Support safety standards that protect children
- Usability testing with families
- Inclusive design
- Conduct research on appropriate supervision
- Best safety practices in marketing

Recommendations for Traffic Safety Community

Regulation, Legislation, Enforcement & Policy

Education & Outreach

Additional Resources

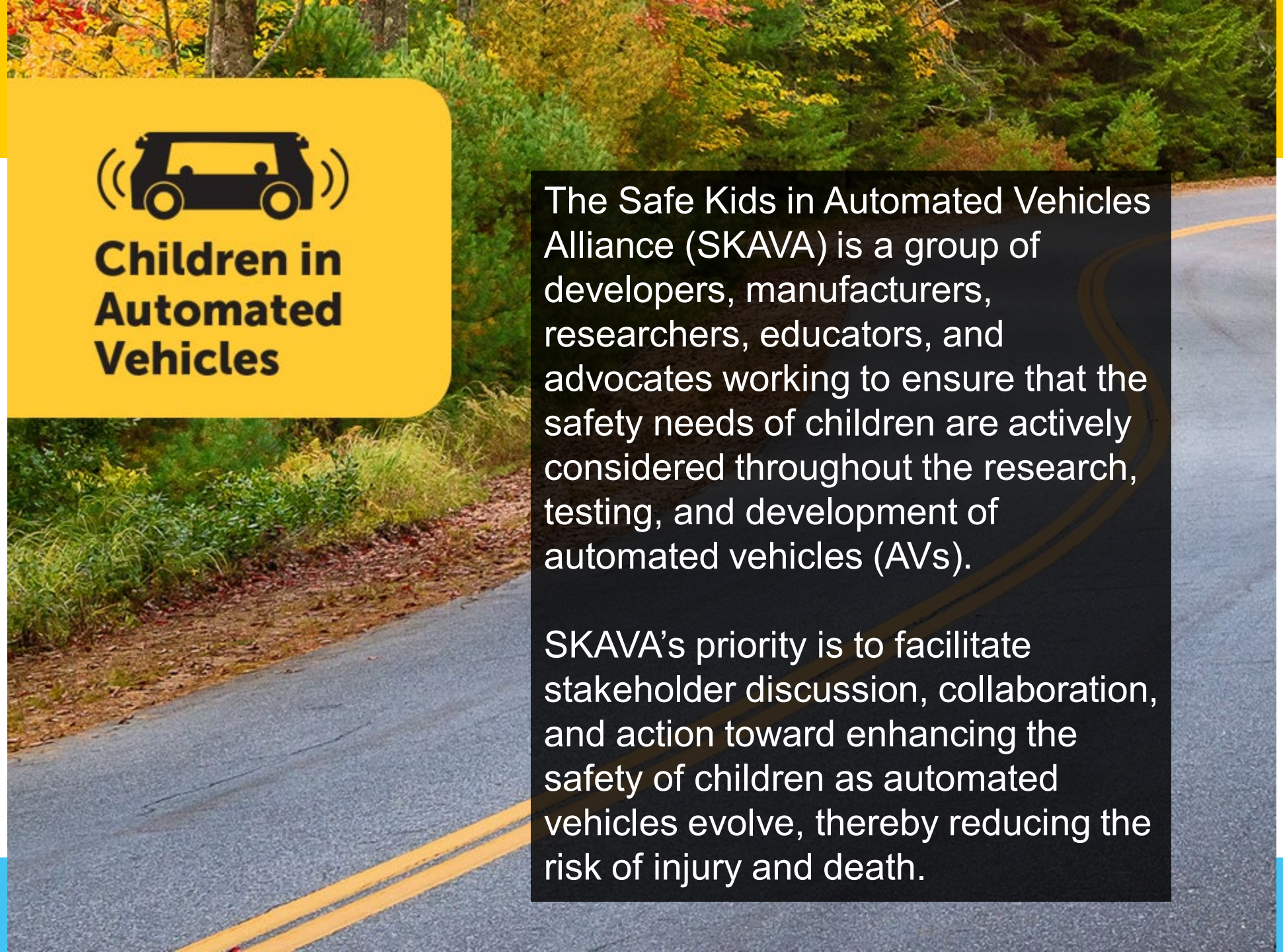
2021
The Automated Vehicles Consortium has created published and updated resources

Policy, Legislation & Enforcement

- Guidance and best practices for ensuring policies and legislation include children

Public Information & Education

- Educational information useful for consumers, certified CPS techs, 1st responders, and law enforcement officers



The Safe Kids in Automated Vehicles Alliance (SKAVA) is a group of developers, manufacturers, researchers, educators, and advocates working to ensure that the safety needs of children are actively considered throughout the research, testing, and development of automated vehicles (AVs).

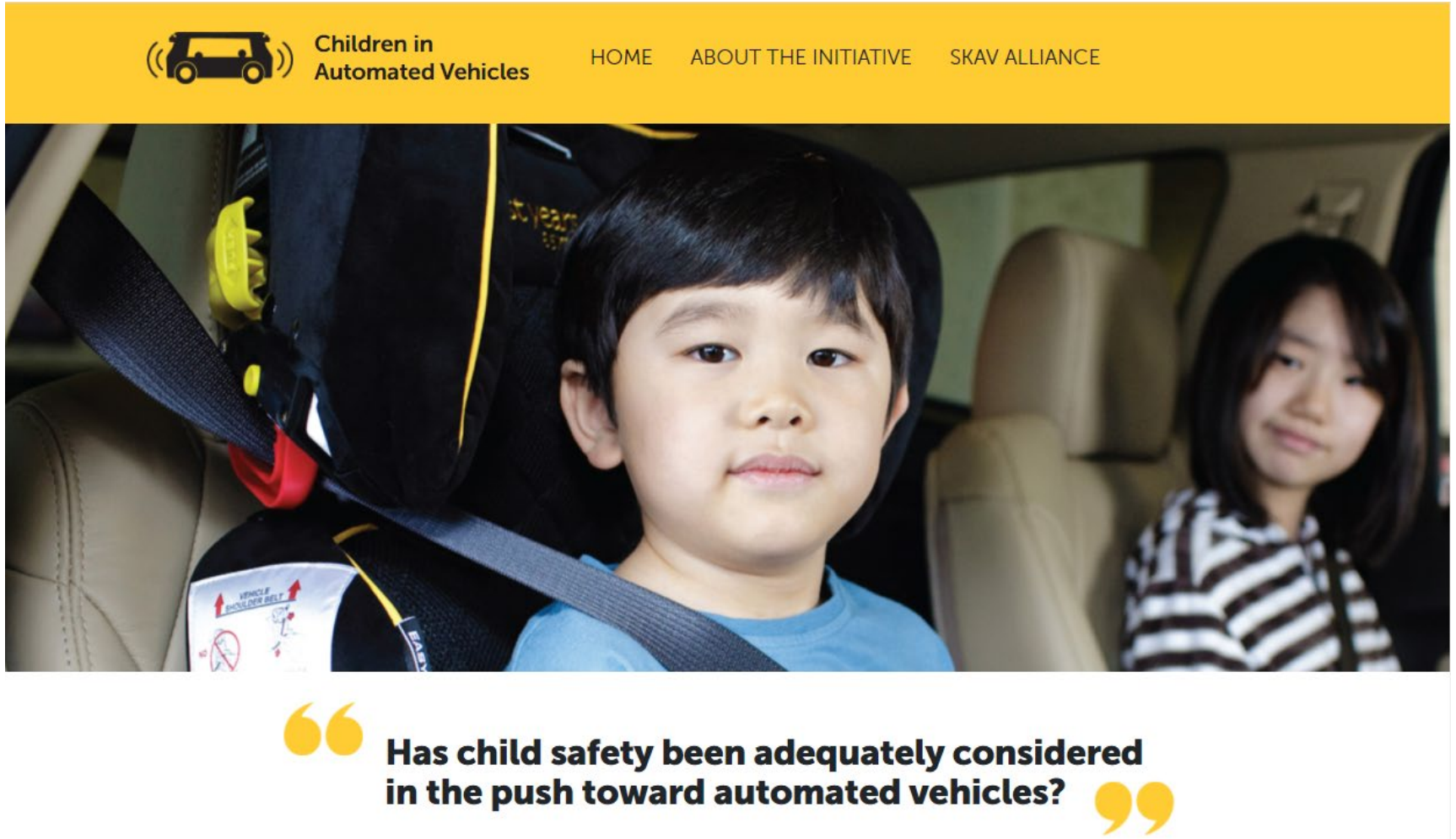
SKAVA's priority is to facilitate stakeholder discussion, collaboration, and action toward enhancing the safety of children as automated vehicles evolve, thereby reducing the risk of injury and death.

Consider this!

- **Who is responsible for restraining children (age 12 and under) correctly in an AV?**
- **At what age can children travel alone in an automated vehicle?**
- **How should we ensure child supervision in driverless AVs?**

safekids.org/AVs

Toolkit HOMEPAGE



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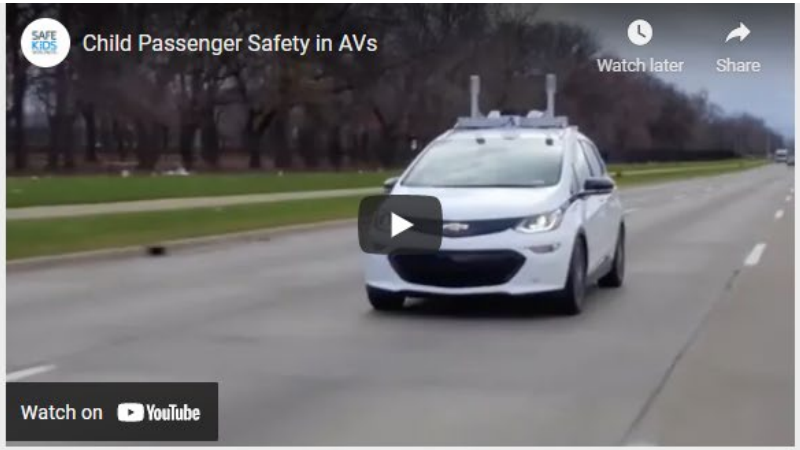


If you are committed to keeping children safe in vehicles, learn about how you can help advocate for child safety considerations in automated vehicles (AVs).

WHY THIS MATTERS NOW

HELP ADVOCATE FOR CHILDREN

EDUCATE THE SAFETY COMMUNITY

DESIGNING FOR CHILD SAFETY

WHY THIS MATTERS NOW

"AVs are currently in development and being tested on public roads. Now is the time to consider the unique needs of children, our most vulnerable passengers, when it comes to this emerging form of transportation."

Driver Assistance & Autonomy

Safety and convenience features like anti-lock braking and cruise control have been developed since the 1950s.

Advanced safety, driver assistance and foundation systems **have** existed and evolved since the early 2000s and continue to advance.

On the Way to Automated Driving

Advanced Safety Features

- Electronic stability control
- Blind spot detection
- Forward collision warning
- Lane departure warning

Advanced Driver-Assistance Features

- Rearview video systems
- Automatic emergency braking
- Pedestrian automatic emergency braking
- Rear automatic emergency braking
- Rear cross traffic alert
- Lane centering assist

Partially Automated Safety Features

- Lane keeping assist
- Adaptive cruise control
- Traffic jam assist
- Self-park

Fully Automated Safety Features

- Driverless vehicles

Moving Toward Full Automation

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation

0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

How Do New Technologies Help?

Human error contributes to 94% of serious crashes

By reducing or eliminating human error, AVs are expected to significantly reduce crashes, injuries and fatalities.

AV: Safety Advantages

- Single-year crash toll in the U.S. (2019):
  - 119,095 children ages 0–14 visited an ER
  - 7,908 children ages 0–14 were hospitalized
  - 280 children ages 0–14 died
- Human error contributes to 94% of serious crashes
- AV technologies remove human error from crashes
- Fewer crashes mean fewer deaths & injuries
- Reductions in pedestrian and other non-occupant injuries and deaths are also expected.

AV: Economic Advantages

- Societal costs of child passenger traffic fatality and injury include medical, work loss, and quality of life loss costs:

- $4.1 Billion – Emergency Department Visits
- $4.8 Billion – Child Hospitalizations
- $2.5 Billion – Child Deaths

  $11.38 Billion TOTAL per year in the United States

- Economic costs are accompanied by devastating social impacts for road users, their families, and the broader community

- Elimination of crash-related deaths and serious injuries is an urgent priority.

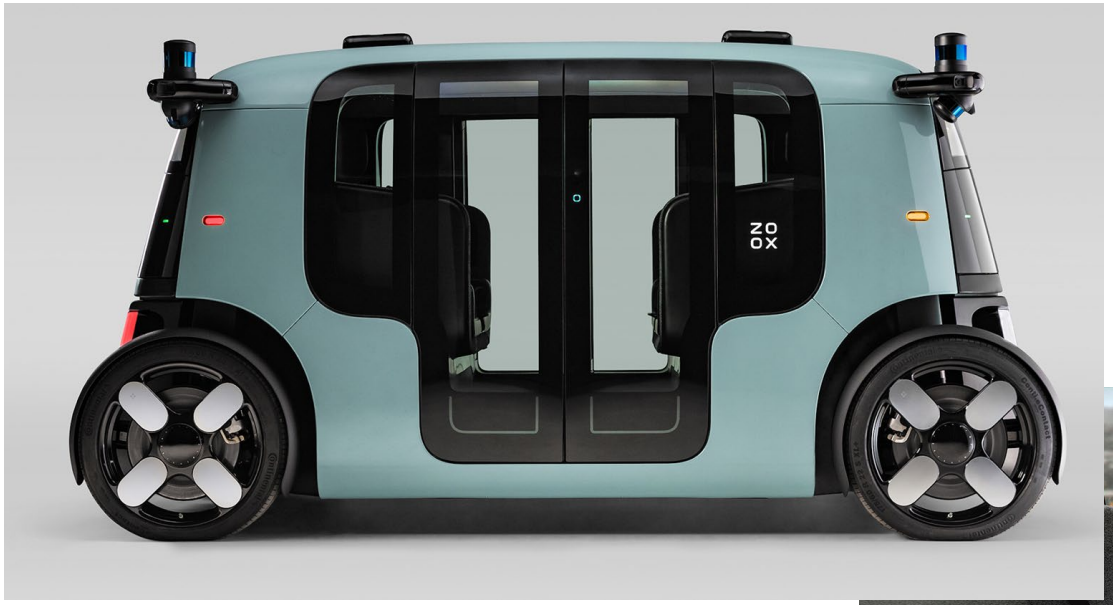
Currently in Use for Real-World Testing

Identifying the Waymo Fully Self-Driving Vehicle

The Waymo fully self-driving Chrysler Pacifica Hybrid minivans can be easily identified by the white color with Waymo logos, roof assembly, front fender additions, or rear roof additions below.

During driverless testing and operation, Waymo's vehicles are fully self-driving at all times, and will not have any person in the driver's seat either steering or otherwise controlling the vehicle.

“Self-driving Shuttles” Also Being Tested



Shown: Zoox bi-directional shuttle

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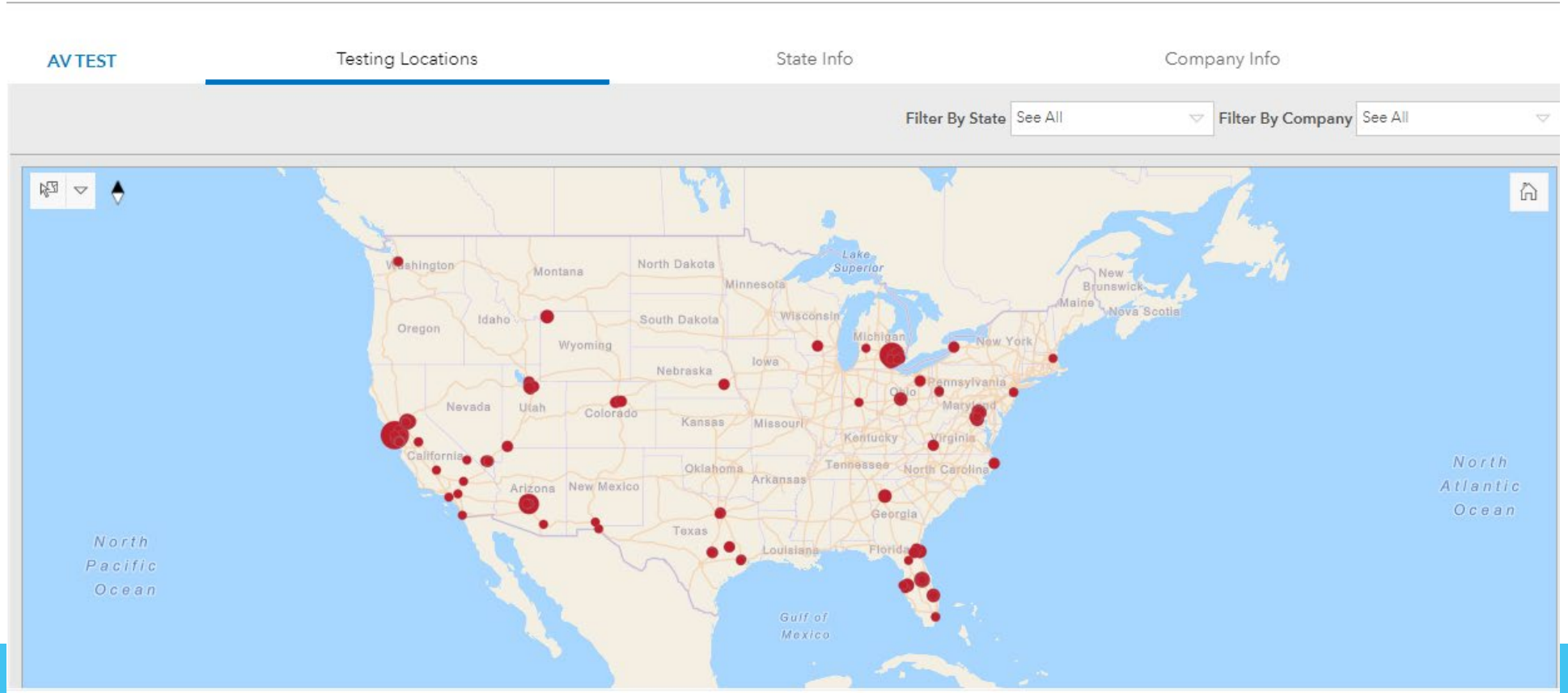
HELP ADVOCATE FOR CHILDREN

Learn if AVs Are on Your Community's Roads

NHTSA is collecting information about AV test locations on public roads from states and companies in the test tracking tool below.



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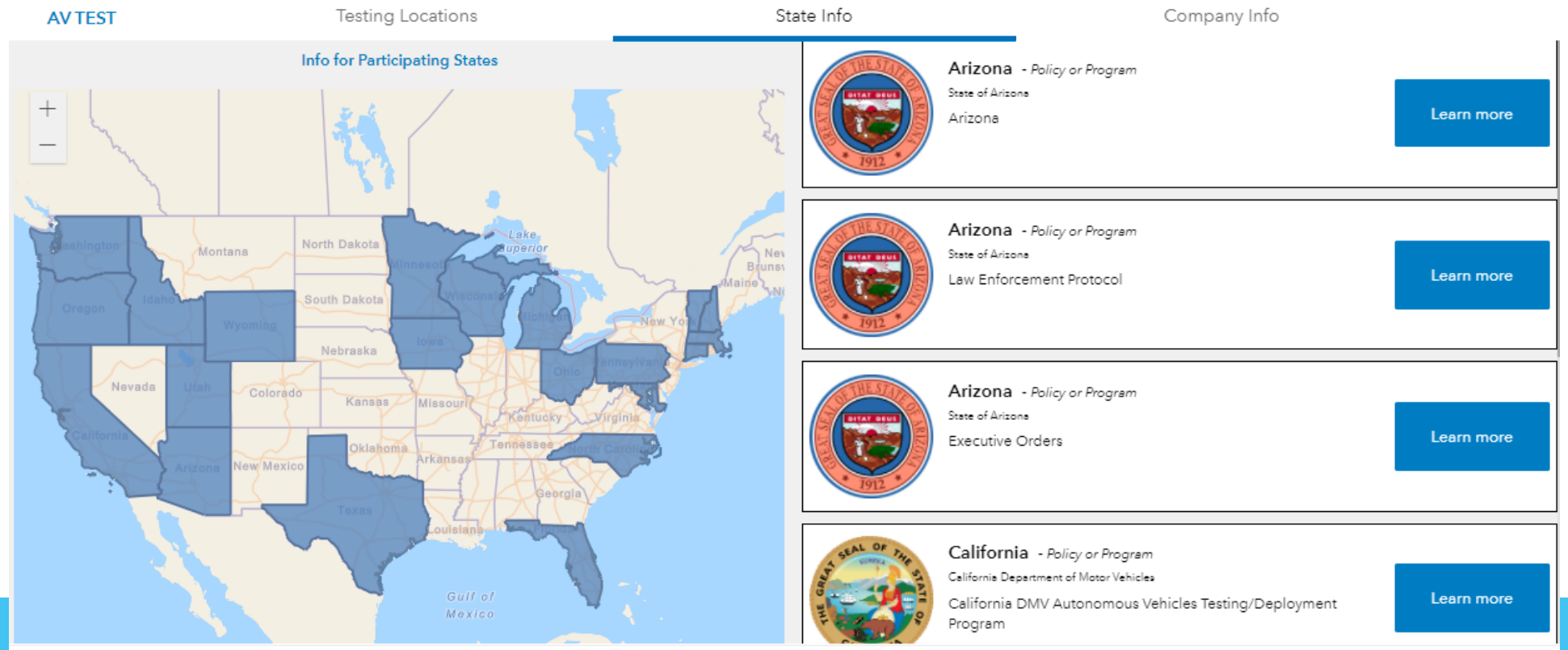

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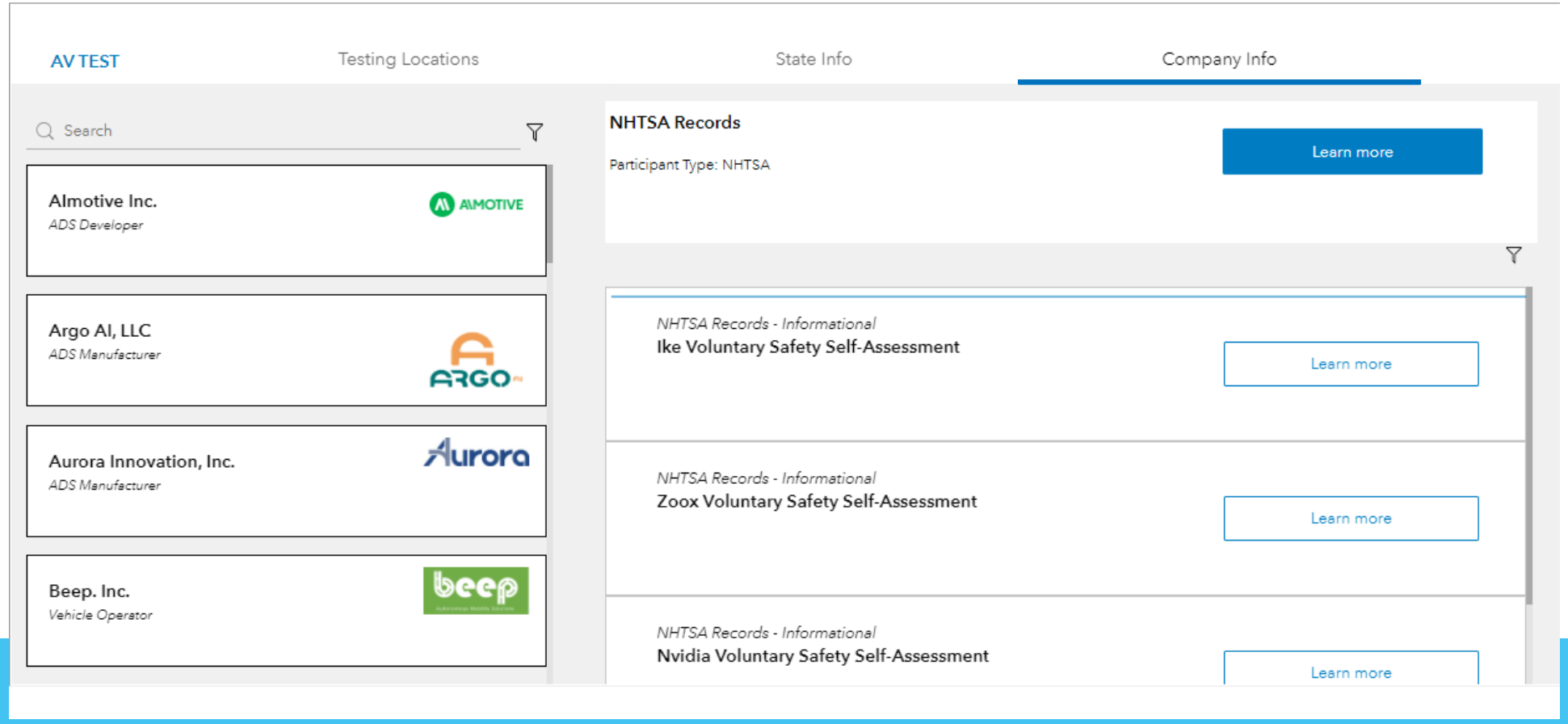
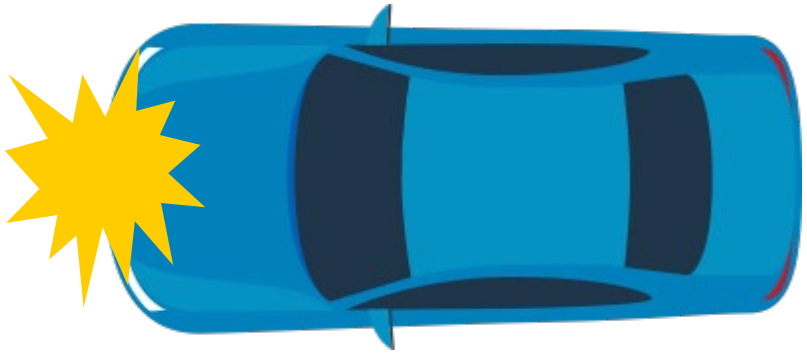


Appropriate Restraints for All Occupants

Will Common Crash Types Shift?

Will frontal crashes continue to be the most common type?

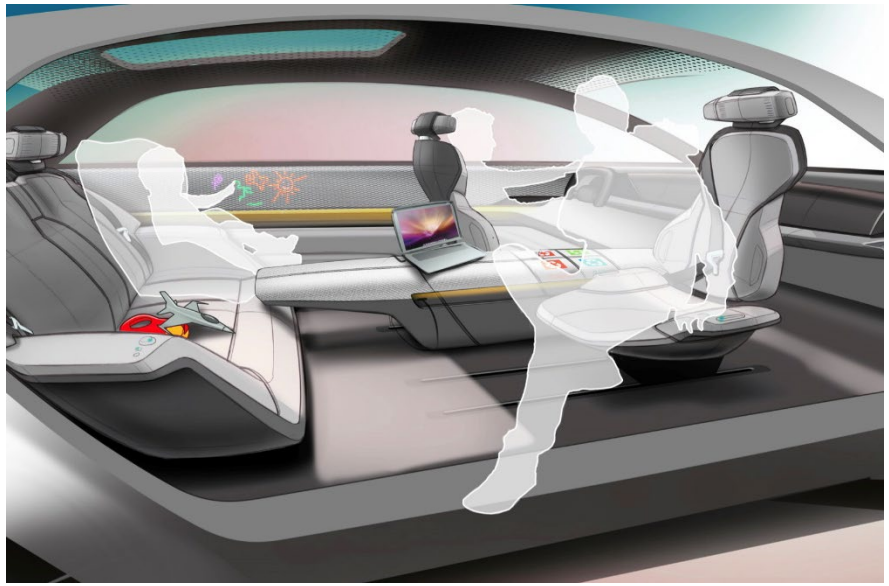


Regulatory and Testing Consideration in the United States:

- FMVSS 213 requires frontal crash protection for car seats
- Near-side lateral testing is anticipated
- No rear or rollover testing is required

Interior: Seating Possibilities

New CPS Considerations



- Direction of car seat
- Direction of vehicle seat
- Recline of vehicle seat
- Direction of vehicle travel
- Presence of air bags
- Vehicle adaptations
- LATCH/Isofix locations
- Limitations of car seat

Example AV Child Safety Considerations

Seat Configuration

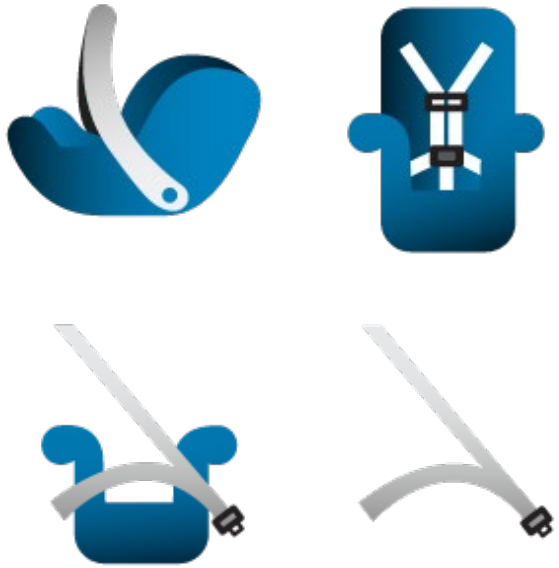
- Require front-facing seat for CR use?
- Can directional misuse be mechanically prevented?
- Instruction label on vehicle seats or belts?
- Labels for booster seat use facing front?
- Mechanical block to force compliance?

Compatibility

- Differences in lower or tether anchors?
- Differences in air bags?

Other

- Front seat installation?
- Potential crash interaction among occupants?
- How will bi-directional vehicles address CRs?



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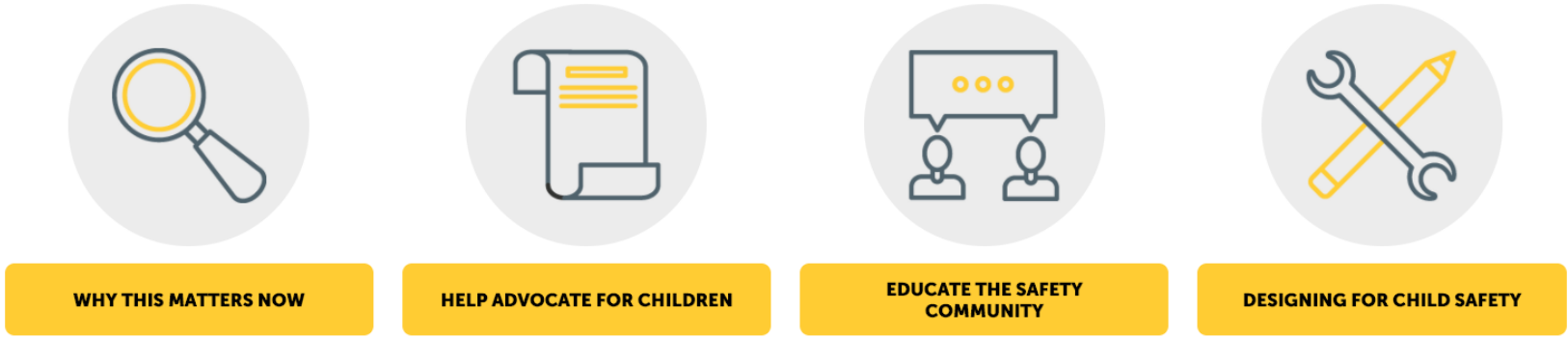
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WHO WILL BE RESPONSIBLE FOR CHILDREN IN AVs?

CAN CHILDREN TRAVEL ALONE IN AVs?

MODEL LEGISLATION FOR GLOBAL USE

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HELP ADVOCATE FOR CHILDREN

WHO WILL BE RESPONSIBLE FOR CHILDREN IN AVs?

Consortium Recommendation

The Consortium recommends that any legislation that currently assigns responsibility for appropriate restraint use by children to the "driver" be amended to ensure compatibility with automated vehicles and to avoid legal loopholes in the future. Instead, this duty should be placed with a responsible adult within the vehicle who is identified for each trip.

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CAN CHILDREN TRAVEL ALONE IN AVs?

Consortium Recommendation

The Consortium recommends that legislation be enacted to establish whether children may travel alone in automated vehicles. If policymakers determine that certain children may travel alone within their jurisdiction, we recommend that the law define a clear set of qualifying conditions. These might include a minimum child age and effective monitoring and/or communication systems in the vehicle.

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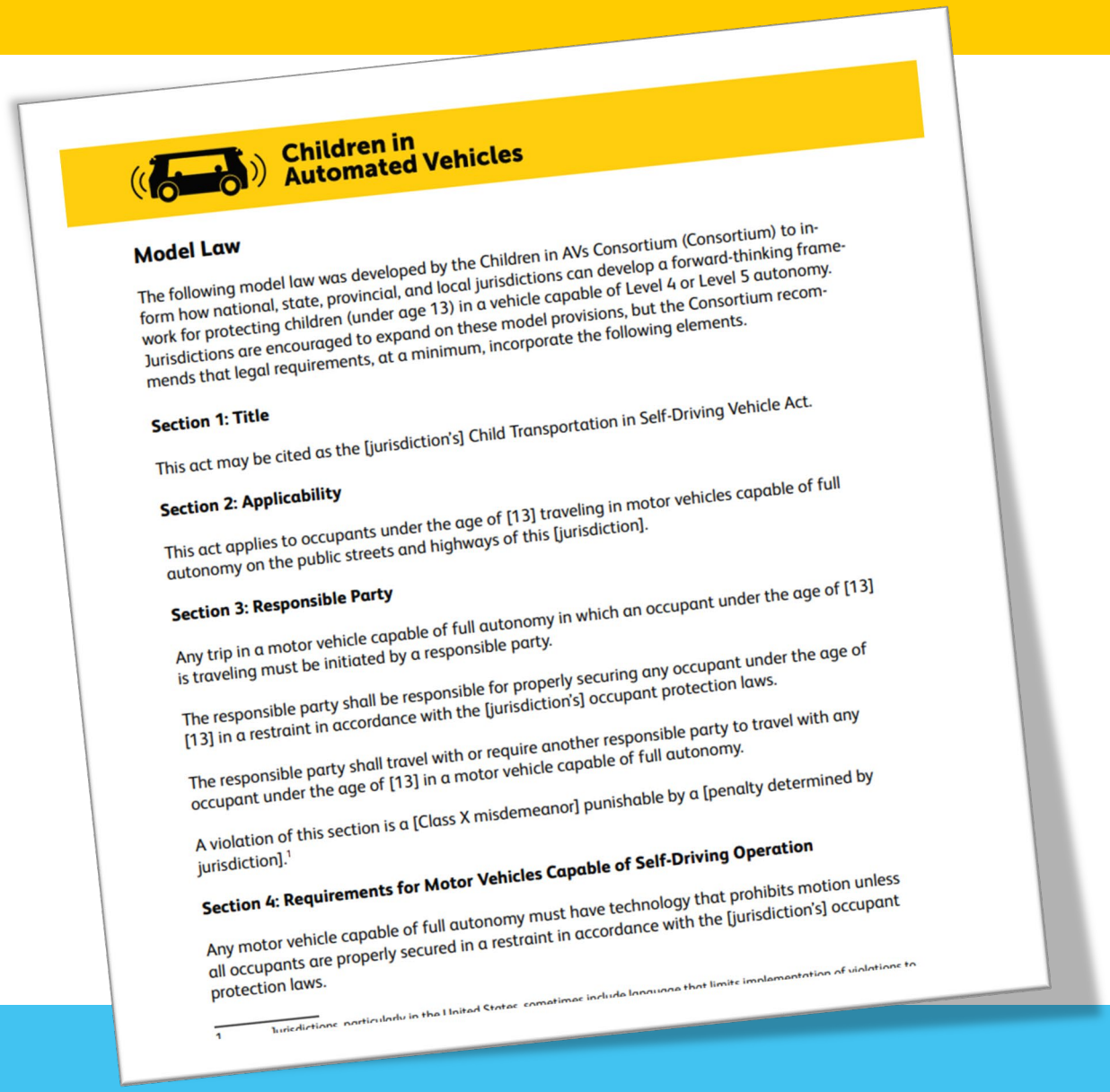

Children in Automated Vehicles

Model Law

The following model law was developed by the Children in AVs Consortium (Consortium) to inform how national, state, provincial, and local jurisdictions can develop a forward-thinking framework for protecting children (under age 13) in a vehicle capable of Level 4 or Level 5 autonomy. Jurisdictions are encouraged to expand on these model provisions, but the Consortium recommends that legal requirements, at a minimum, incorporate the following elements.

Section 1: Title

This act may be cited as the [jurisdiction's] Child Transportation in Self-Driving Vehicle Act.

Section 2: Applicability

This act applies to occupants under the age of [13] traveling in motor vehicles capable of full autonomy on the public streets and highways of this [jurisdiction].

Section 3: Responsible Party

Any trip in a motor vehicle capable of full autonomy in which an occupant under the age of [13] is traveling must be initiated by a responsible party.

The responsible party shall be responsible for properly securing any occupant under the age of [13] in a restraint in accordance with the [jurisdiction's] occupant protection laws.

The responsible party shall travel with or require another responsible party to travel with any occupant under the age of [13] in a motor vehicle capable of full autonomy.

A violation of this section is a [Class X misdemeanor] punishable by a [penalty determined by jurisdiction].[1]

Section 4: Requirements for Motor Vehicles Capable of Self-Driving Operation

Any motor vehicle capable of full autonomy must have technology that prohibits motion unless all occupants are properly secured in a restraint in accordance with the [jurisdiction's] occupant protection laws.

1 Jurisdictions, particularly in the United States, sometimes include language that limits implementation of violations to

Child Safety at the Forefront

AV Developers, Vehicle Manufacturers, Car Seat Manufacturers, Regulators and Safety Experts must communicate throughout the evolution, and child safety needs to be a primary consideration

ADVOCATES AND PARENTS NEED COMMUNICATION TOO!

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HOW WILL FEDERAL REGULATIONS BE UPDATED?

HOW CAN REGULATIONS AVOID UNINTENDED CONSEQUENCES FOR CHILDREN?

HOW WILL CRASH REPORTING CAPTURE CHILD DATA?

Educators Need Education Too!

2017 survey: 1,300 certified CPS Technicians

- 131 actively following and 811 “know a little” about AV
- 975 have never started a conversation about AV
- Child supervision (1,005) is the biggest AV concern
- Believe AV is in distant future

AV design & development have been progressing for decades, but widespread visibility is now increasing

What do CPS Advocates Need to Know?

Advocates play an important role in family education

- Restraint use for all
- Car seat selection, installation and use
- Air bag interaction and warnings
- Supervision for children under age 13

Advocates can also play a role in state legislation.
Familiarity with basic vehicle features is important.
Vehicle owner's manuals and online resources must be consulted.

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EDUCATE THE SAFETY COMMUNITY

> Before we can educate parents and caregivers, we must educate ourselves about automated vehicles. Child passenger safety curricula have not yet been adapted to address these developing technologies.

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EDUCATE THE SAFETY COMMUNITY

DOWNLOAD THE POWERPOINT PRESENTATION

DOWNLOAD SPEAKER INSTRUCTIONS FOR POWERPOINT

DOWNLOAD THE INFOGRAPHIC

Toolkit

EDUCATE THE SAFETY COMMUNITY


Children in Automated Vehicles

What is the issue?

What can you do?

Resources

DOWNLOAD THE FACT SHEET

DOWNLOAD SOCIAL MEDIA SHAREABLES

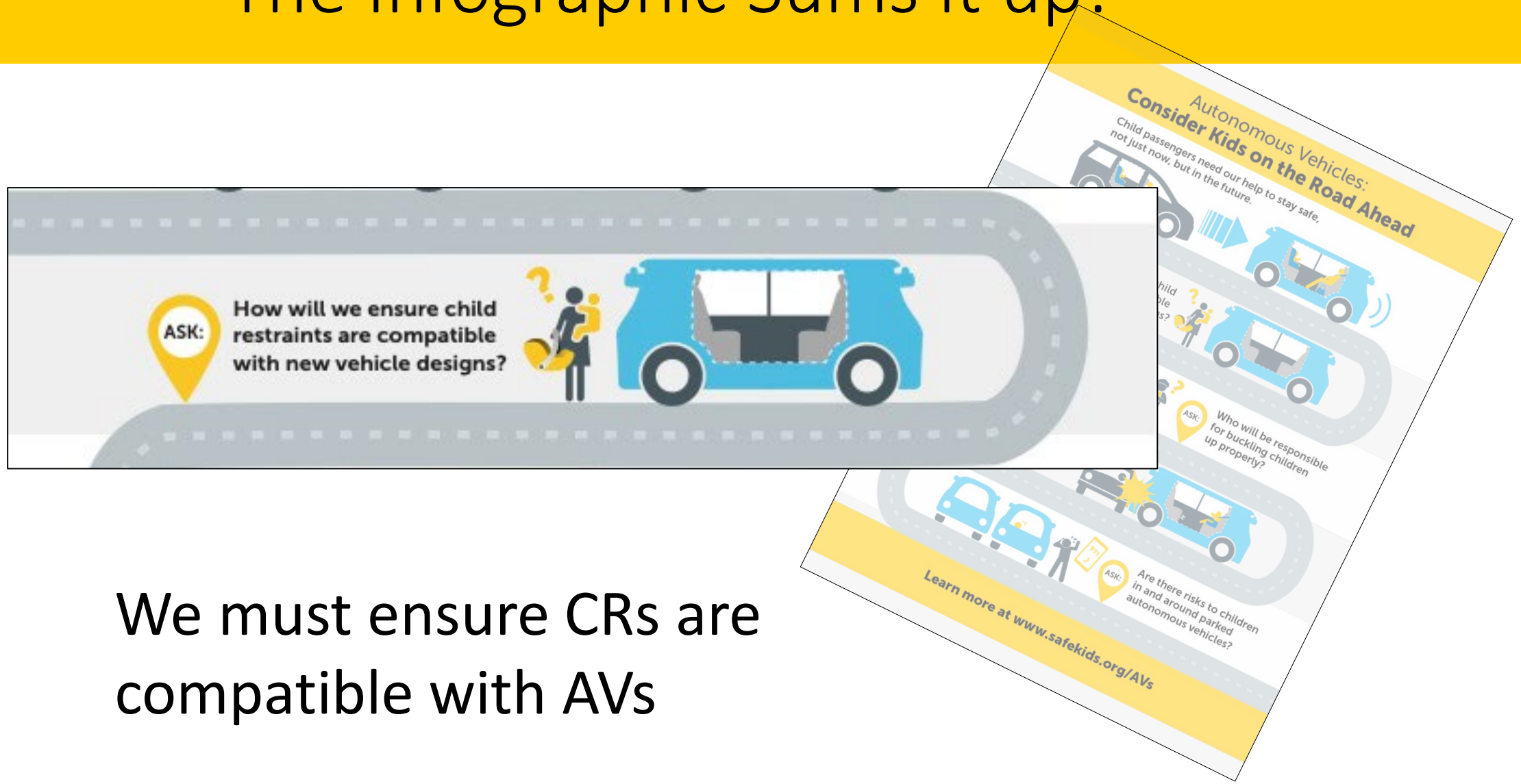
DOWNLOAD THE VIDEO

The Infographic Sums it up!

ASK:

Consider Kids on the Road Ahead

The Infographic Sums it up!

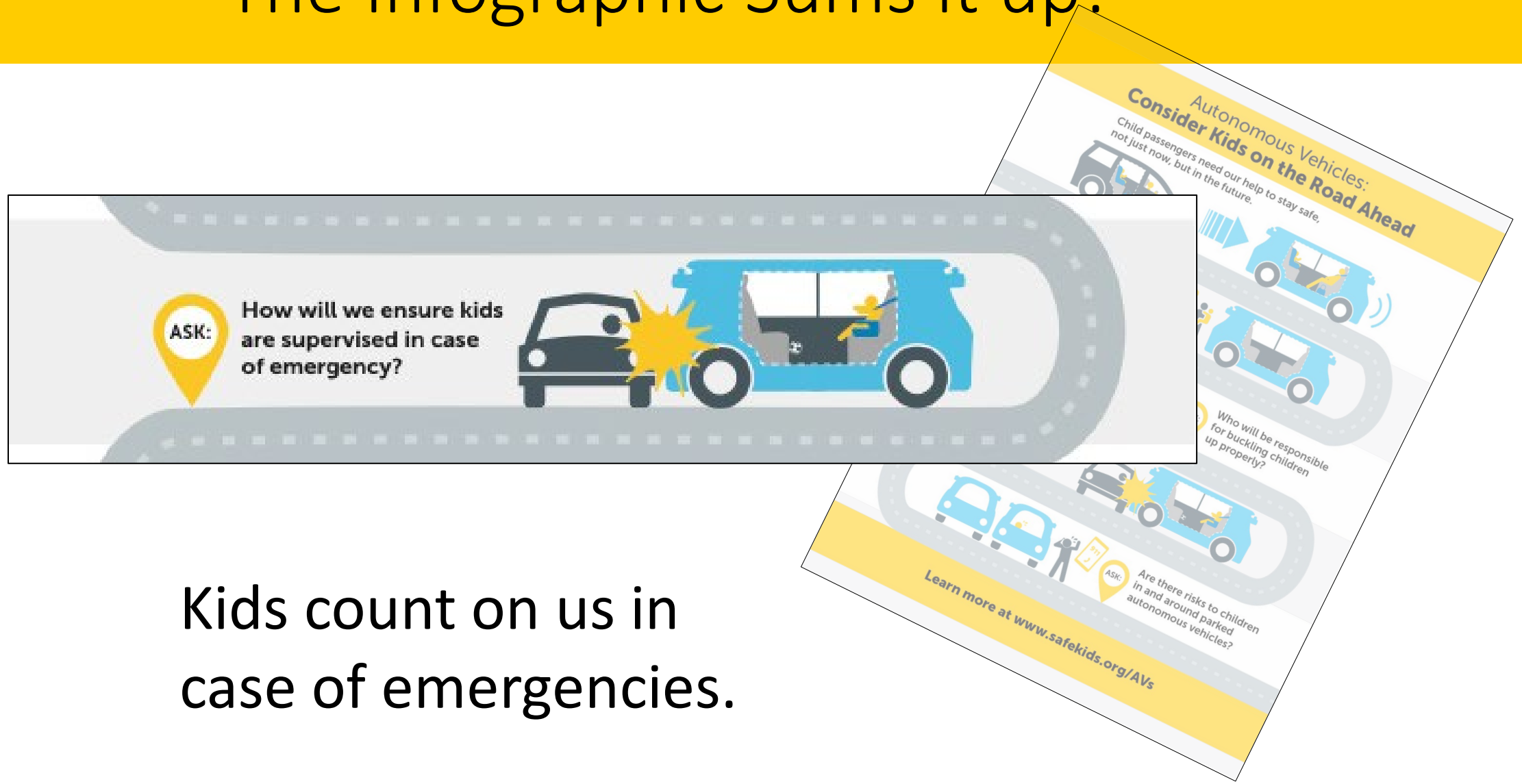


We must ensure CRs are compatible with AVs

The Infographic Sums it up!

Kids need supervision to ensure they're safe and buckled up.

The Infographic Sums it up!



Kids count on us in case of emergencies.

The Infographic Sums it up!

And, kids need protection in and around parked cars.

Learn more at www.safekids.org/AVs

Get Involved & Stay Updated

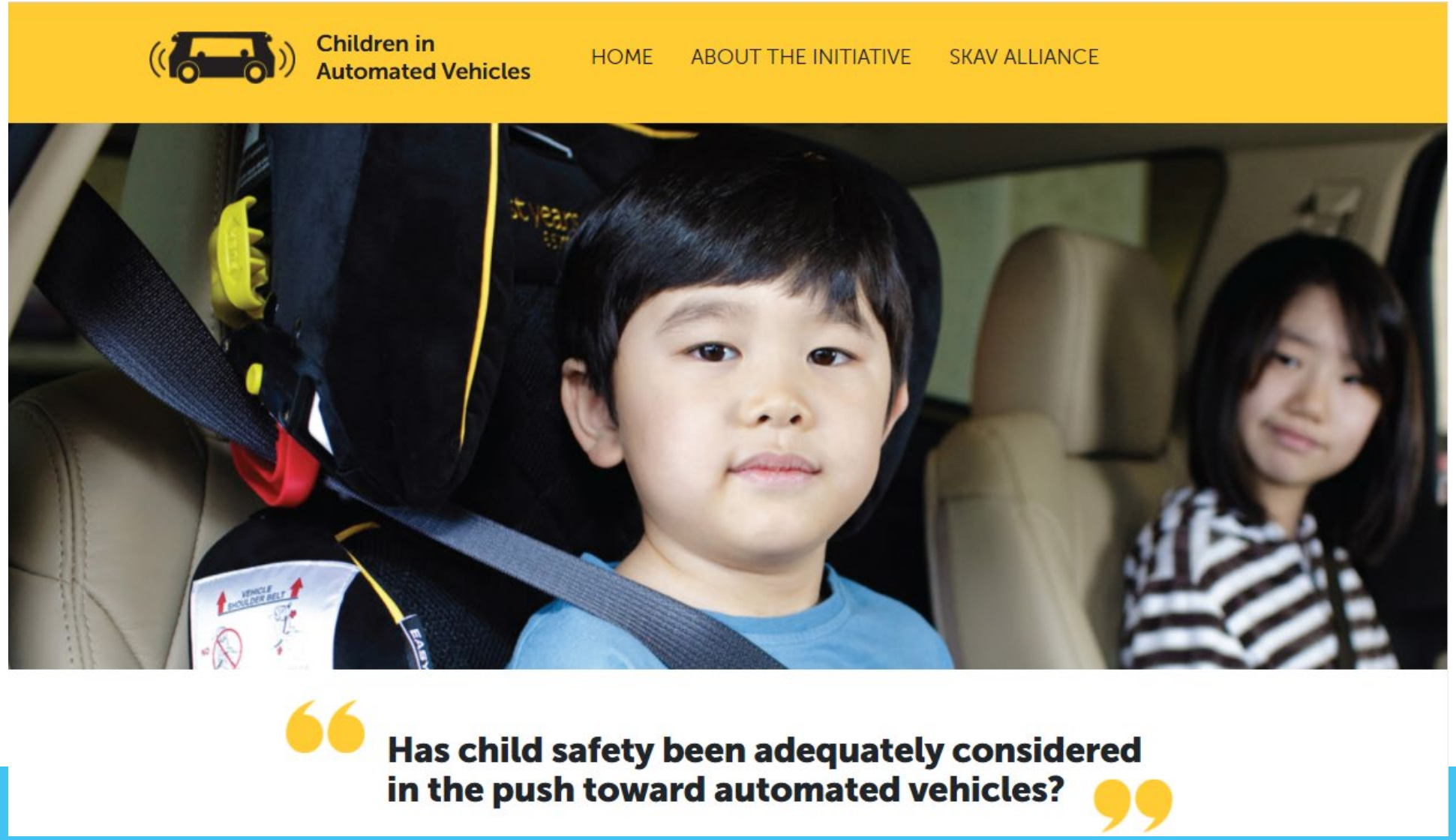
Online Toolkit:

- Presentations
- Webinars
- Useful information
- Links to additional information sources
- **Visit: https://www.safekids.org/AVs**

Safe Kids in Automated Vehicles Alliance:

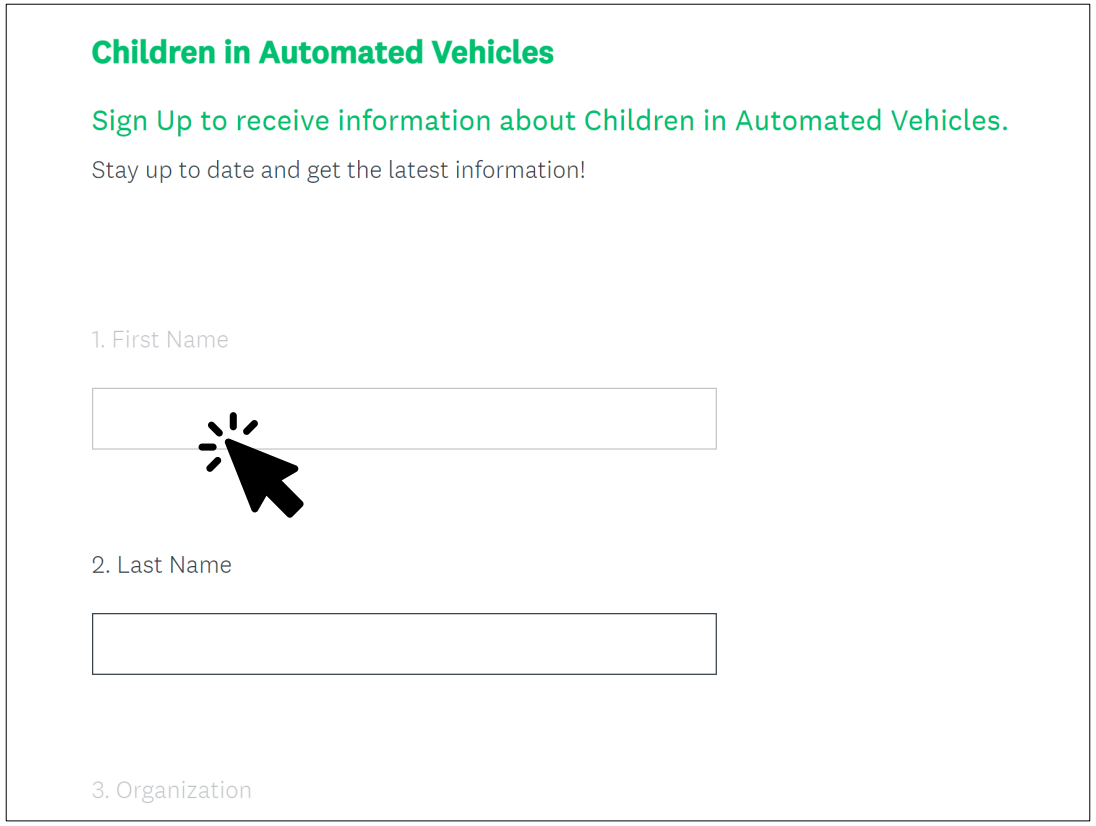
- New information will be communicated
- Opportunities for input
- Educational resources
- **URL TO JOIN: https://www.safekids.org/AVs**

Stay Educated & Stay Involved



Stay Educated & Stay Involved

Periodic updates on new materials, items of interest, educational opportunities and more:



Questions?

www.safekids.org/AVs

Questions and Answer Session

Please enter your questions in the Q & A pod

Thank you!

Please fill out our evaluation: https://www.surveymonkey.com/r/8YZZQ7D

Visit our website:
www.ChildrensSafetyNetwork.org