Data for Automated Vehicle Integration

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Access to data is a limiting factor for AV deployment. (It's also a sensitive topic.) One solution: data exchanges.

USDOT is using our convening power to understand critical use cases for data exchange and the appropriate federal role to enable them.
Bringing Stakeholders Together for Meaningful Conversations on Data

(IT'S REALLY HARD TO DO)
AV Data Guiding Principles (Beta)

1. Promote proactive, data-driven safety, cybersecurity, and privacy-protection practices.

2. Act as a facilitator to inspire and enable voluntary data exchanges.

3. Start small to demonstrate value, and scale what works toward a bigger vision.

4. Coordinate across modes to reduce costs, reduce industry burden, and accelerate action.

https://www.transportation.gov/AV/Data
## AV Data Framework (Beta)

<table>
<thead>
<tr>
<th>Category*</th>
<th>Goals</th>
<th>Specific Data to Exchange</th>
<th>Real-World Examples</th>
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</thead>
</table>
| Business-to-Business (B2B) | • Mitigate known and emerging cyberthreats  
• Improve industry-wide safety through shared learning in safety-critical and edge case scenarios  
• Inform future insurance policies  
• Accelerate the resolution of legal liability claims | • Cybersecurity incidents  
• Edge cases  
• Near-miss events  
• Performance in safety-critical scenarios  
• Post-accident data | • Automotive Information Sharing and Analysis Center  
• ClinicalStudyDataRequest.com (CSDR)  
• PEGASUS  
• TNO Streetwise |
| Business-to-Government (B2G) | • Understand performance of rapidly evolving technology during testing phases  
• Inform policies and investments to improve system safety and efficiency | • Cybersecurity incidents  
• Near-miss events  
• Performance in safety-critical scenarios  
• Crash reconstruction | • Aviation Safety Information Analysis and Sharing  
• Voluntary Safety Self-Assessments (Part of ADS 2.0) |
| Business-to-Infrastructure (B2I) | • Help vehicles navigate safely around obstacles and in adverse weather conditions  
• Reduce system congestion  
• Help optimize infrastructure maintenance | • **Work zone activities and geometrics**  
• Road weather information  
• Missing signage or broken infrastructure  
• Curb use rules and availability | • National Transit Map  
• Waze Connected Citizens Program  
• Meteorological Assimilation Data Ingest System |
| Open Training Data (X2X) | • Improve ADS performance in common safety-critical scenarios  
• Support basic research and education | • Road, signage, and other infrastructure imagery  
• Edge cases  
• Bike/ped near misses  
• Truck platooning pilot data | • ImageNet  
• Multimedia Commons  
• Nexar NEXET  
• BikeMaps.org  
• FHWA Platooning POC |

*represents two-way data exchange

[https://www.transportation.gov/AV/Data](https://www.transportation.gov/AV/Data)
Outcomes
• Clarity on value of federal government as convener and facilitator
• Priority use cases for data exchange: work zones, scenarios, cybersecurity, others

Next Steps
• Enable voluntary data exchanges as “One DOT” via pilot projects
• Incorporate into AV policies
• Continue conversations

Summary Report available via: https://www.transportation.gov/AV/Data
Work Zone Data Exchange Project

THE LOCAL DATA CHALLENGE
The Local Data Challenge

Up-to-date information about dynamic conditions occurring on the roads – such as construction events – can help AVs navigate safely and efficiently.

Many infrastructure owners and operators (IOOs) maintain data on work zone activity, but lack of common data standards and convening mechanisms makes it difficult and costly for third parties – including original equipment manufacturers (OEMs) and navigation applications – to access and use these data across various jurisdictions.
Learning from the Open Transit Data Story

A simple specification...

... with a wide range of uses
A Federated “Front Door” to Transit Data

Now, basic transit data is easy to find and use nationwide; transit agencies and their users continue to collaborate on the spec.
Work Zone Data Exchange Project (Overview)

Purpose

• To jumpstart voluntary adoption of a basic work zone data specification
• To enable collaborative maintenance and expansion of the spec

Outcomes within 6 months

• Data producers make available an active work zone data feed using a common, non-proprietary specification
• Non-government developers use that data in a meaningful way – thus establishing a minimum viable product of voluntary data exchange for work zone data

Big Picture Outcome

• Repeatable approach to accelerate harmonization of local data sources
Work Zone Data Exchange Project
(Notional timeline)

Feb 2018:
Charter project

Mar 2018:
Kick off

May 2018:
USDOT synthesizes inputs from data providers and produces strawman data dictionary based on existing data sources

June 2018:
Reach consensus on data dictionary (common core, extensible fields for future) and encoding spec

July 2018:
Users validate sample data; lock in data dictionary v1

July 2018:
Data providers implement the common spec; data users demonstrate use of the data

Aug 2018:
Promote broadly; Start process of adding new fields for v2

Technical assistance (immediate, and TBD longer term)
Discover AV-specific needs that go beyond current data feeds
Establish mechanism to maintain and expand spec in future
Longer-term Needs Discovery (FHWA Work Zone Data Initiative)

1. WZ Planning and Coordination
2. Law Enforcement and Emerg. Service Providers
3. Construction and Maint. Contract Monitoring
4. WZ Impact Analyses
5. Safety and Mobility Performance Measurement
6. Real Time System Mgmt./Traveler Info and CAV Hardware and System Readiness
7. WZ Impact Analyses

WZDx vk
WZDx vj
WZDx vi
WZDx v1

Data spec enhancements due to operational and technological enhancements
Data spec resulting from current short-term effort

U.S. Department of Transportation
Federal Highway Administration
Relationship between Data & Digital Infrastructure for AV Integration

(HINT: DATA = DIGITAL)
A Range of Potential Federal & Non-Federal Roles
Recap: Meaningful Conversations on Data

• Start with they “why” – what problem are you trying to solve through data?
• Then talk about “who” needs to be involved, and “what” data they’re exchanging
• Then dive into “how” to make this happen
• Consider using the AV Data Framework and Principles to jump-start your conversations (start small and scale)!
Thank You!

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