



U.S. Department of Transportation
Federal Highway Administration

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Highway Research Center

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TFHRC Updates - MAP Tool and CVCS Compiler

Connected Vehicle Pooled Fund Study
Meeting

Marisa Migliore (FHWA)

May 2025

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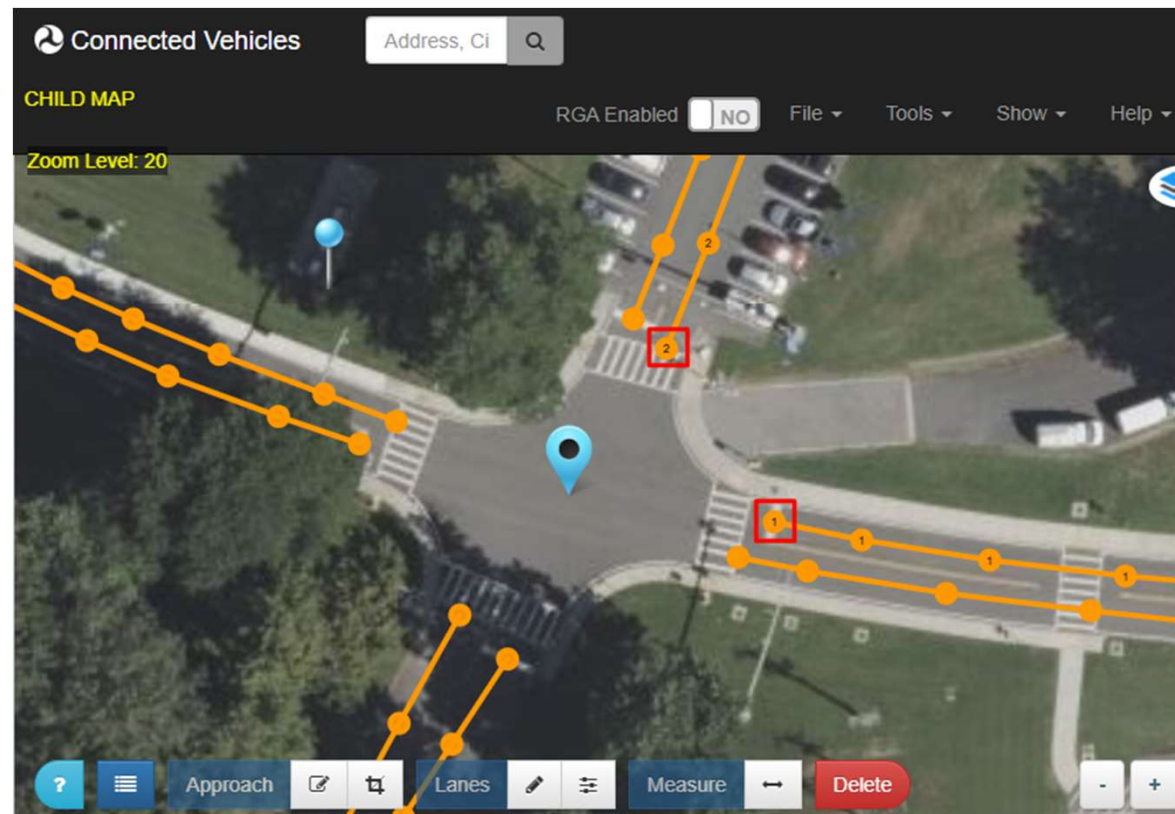
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MAP Tool Updates

MAP tool



- ▶ A Graphical User Interface (GUI) for connected vehicle MAP message creation

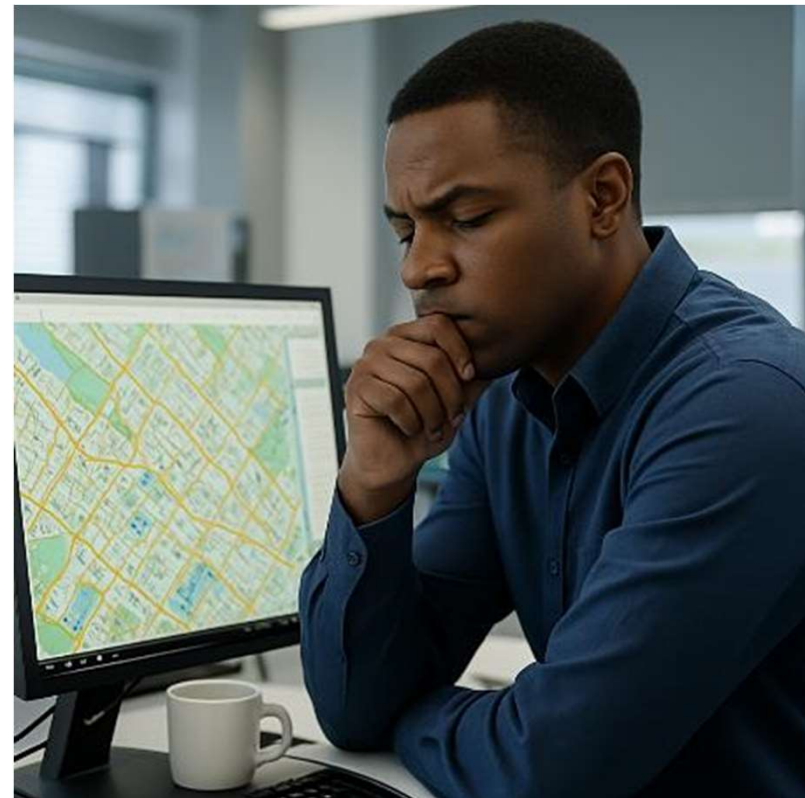


Source: USDOT.

This is David

The MAP tool makes life easier for connected intersection deployers, but he's run into a few problems.

- ▶ Accuracy
- ▶ Labor to create messages



Source: Google Gemini.⁽¹⁾

Features added Dec 2024



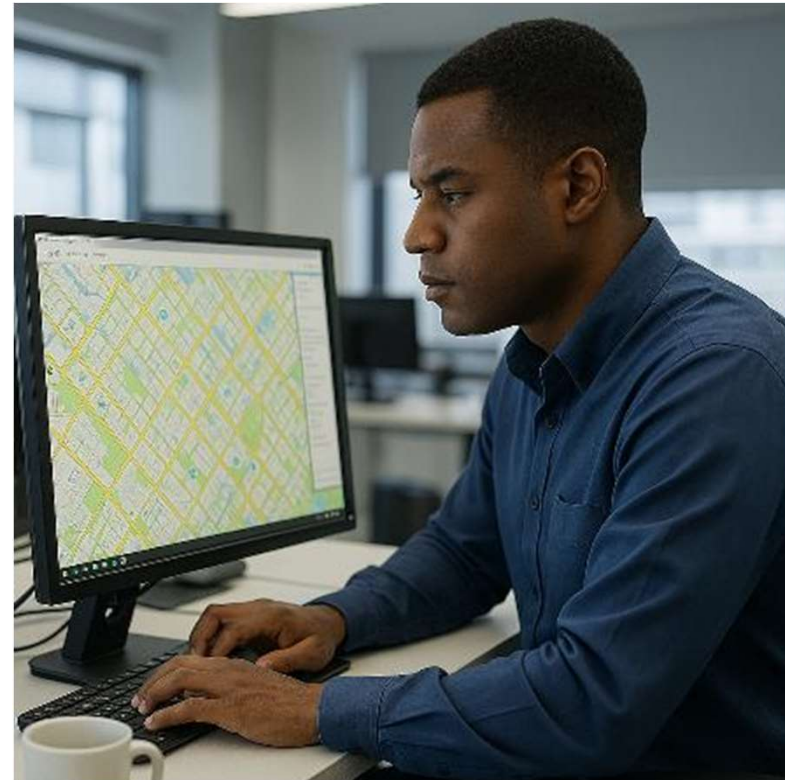
- ▶ Supports **2024 version** of J2735



- ▶ Supports speed limits by lane



- ▶ DDoS protection



Source: Google Gemini.⁽¹⁾

Upcoming features - (1/2)



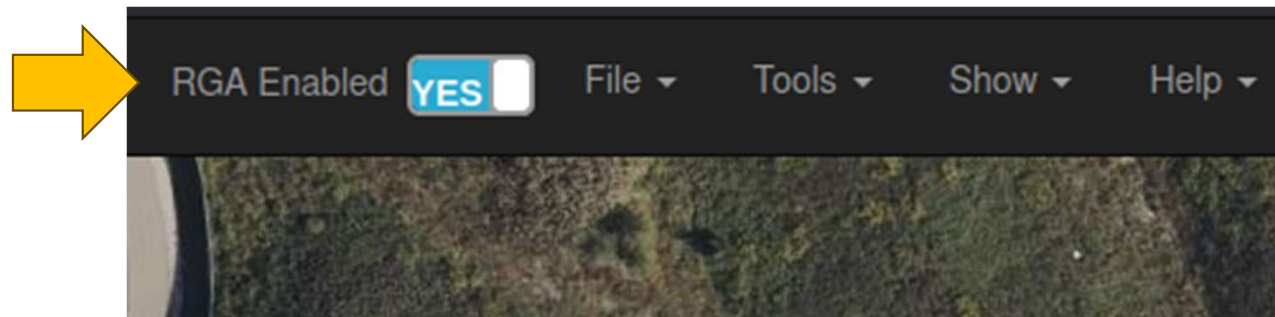
- ▶ Bing Maps (previous basemap) is being sunsetted
- ▶ A new basemap (Azure Maps) for ~75 cm accuracy - June 2025. Report with UC Riverside.
- ▶ Under consideration - USDOT ends hosting, transitions open-source tool to community?



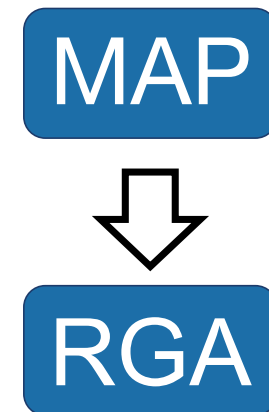
In Progress - (2/2)



- ▶ Dual function J2945/A Road Geometry Attributes (RGA) and J2735 MAP generation, updated instructions. Can convert MAP to RGA with a few edits – expected approx. September 2025.



Source: USDOT.



An important note



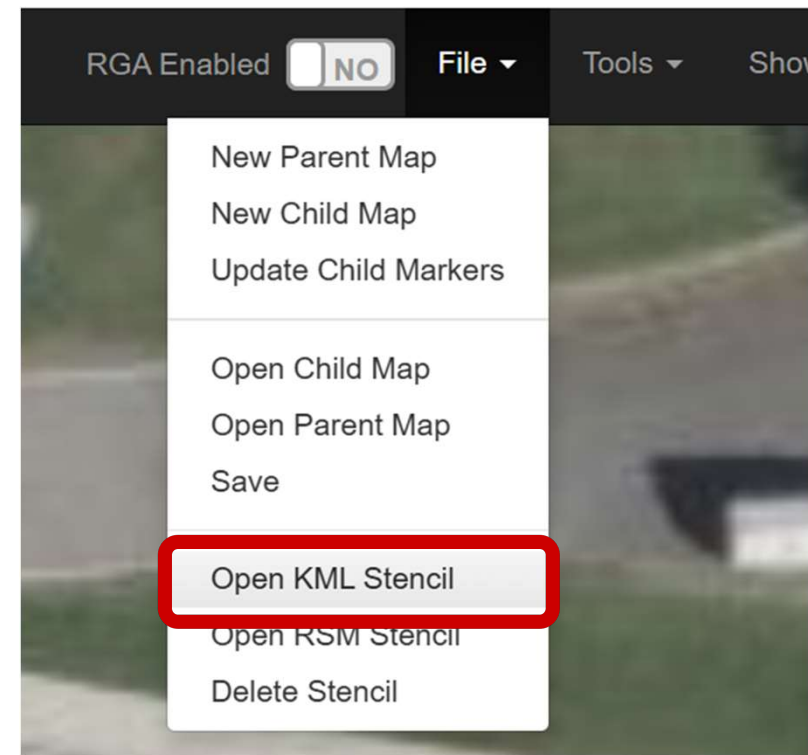
- ▶ Again, MAP creation is not being taken away, RGA is just a new option.



Tips and Tricks



David can use Computer Aided Design (CAD) as-builts as a guide by converting them to Keyhole Markup Language (KML), then importing - or using Google Earth files



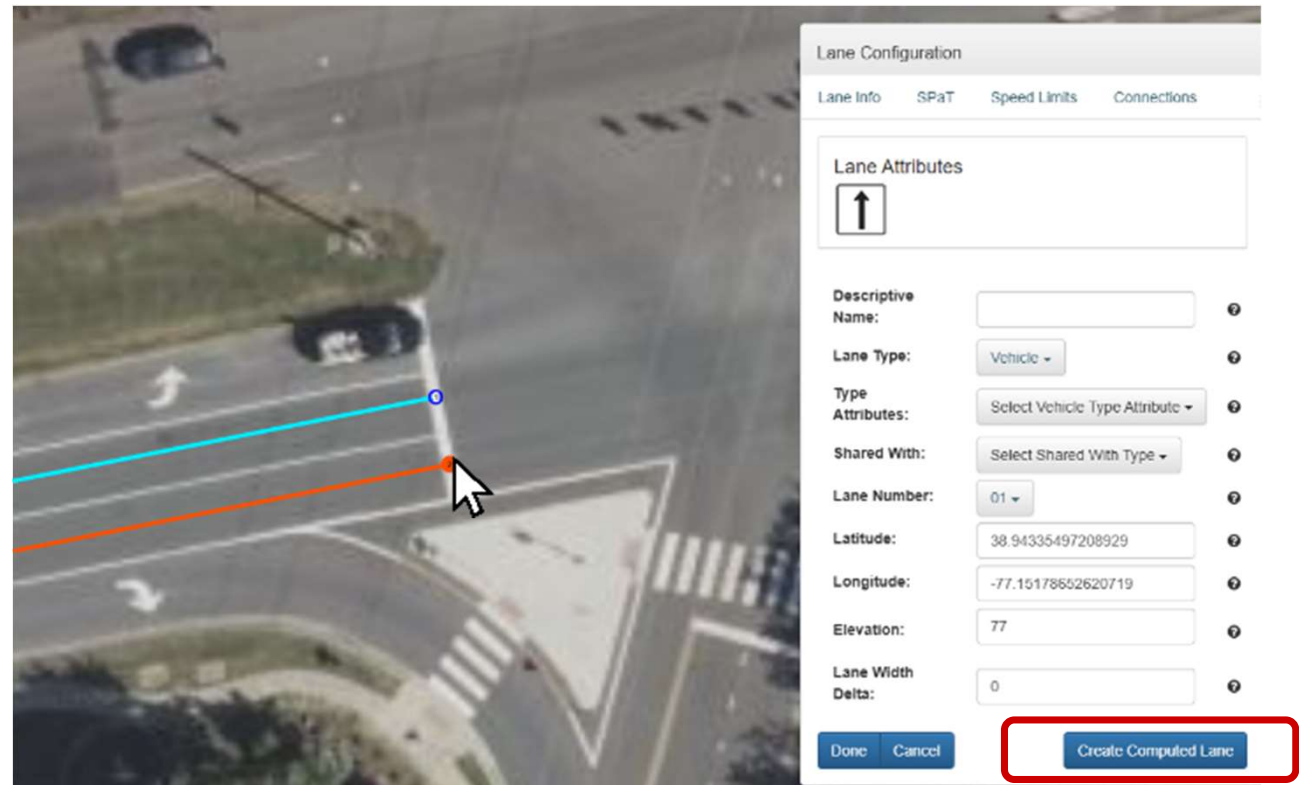
Source: USDOT.

Tips and Tricks



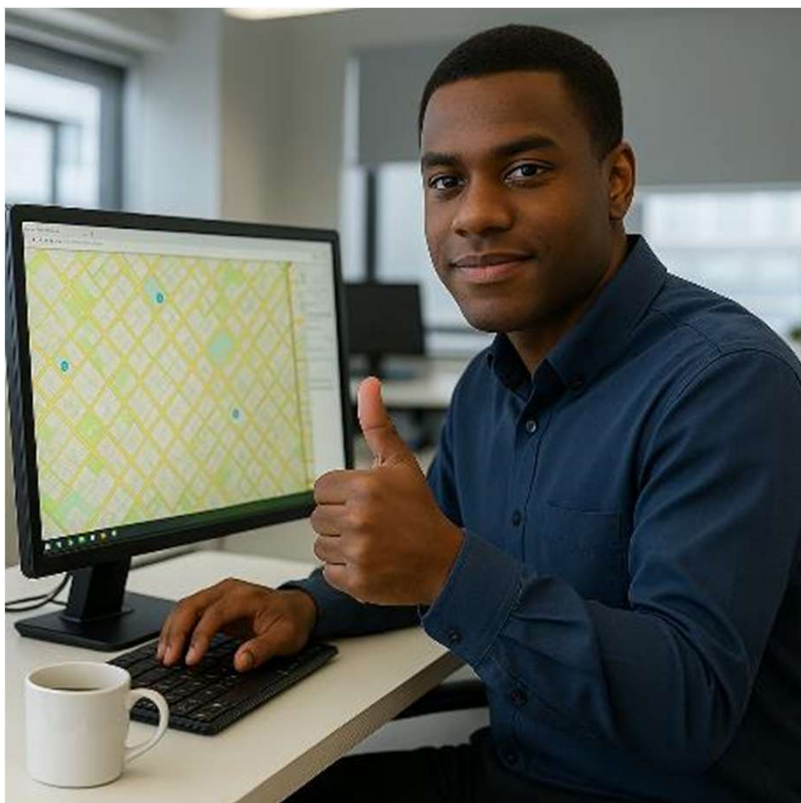
David can also use computed lanes to quickly create multiple lanes next to each other

Instructions are under the “help” menu



Source: USDOT, Freepik.⁽²⁾

David is finished with the MAPs



Source: Google Gemini. ⁽¹⁾



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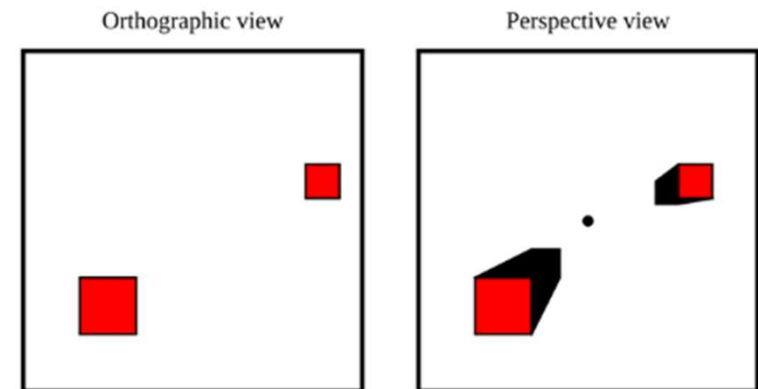
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Potential Ideas for the MAP tool



1. **Multiple basemaps**
2. **HD** map messages to **MAP** messages
3. **Custom image** to draw on using 2-3 surveyed base points
4. **Orthoimagery** (corrects for tall objects, more accurate representation of distances)
5. **Automation - computer vision** for intersection aerials
6. **Creating lanes by clicking on lane lines** vs drawing a centerline

7. Incorporating MAP messages into **simulations**



Source: Kuiper, Wikimedia Commons.⁽³⁾



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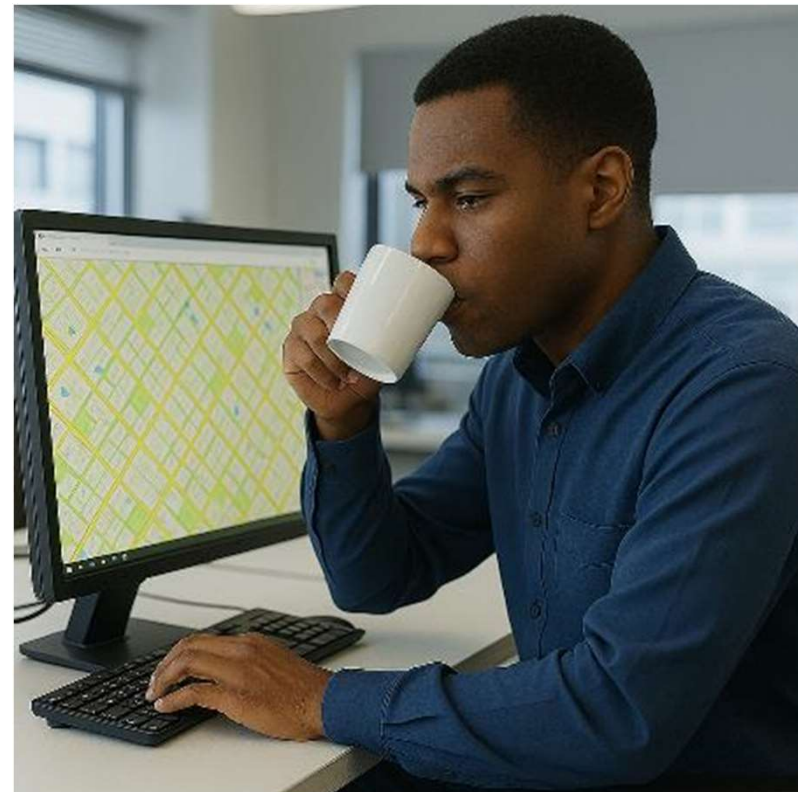
CVCS Compiler (Message Validator and TIM tool)

Back to David



Now that David has created some MAP messages, he'd like to validate them to ensure they are correct, then apply for a Security Credential Management System (SCMS) certificate for secure message transmission.

He'd also like to add some Traveler Information (TIM) messages in the area around the MAP message deployment.



Source: Google Gemini.⁽¹⁾



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Coming soon - Message Validator



- ▶ Check messages against J2735 / J2945 / J3224 standards before deploying
- ▶ Next version updates to 2024 version of J2735

Unified Model Architecture Using J2735 3/2016

SEMI ASN.1 Specification Version:

Data Encoding:

Message Type:

File to upload:

No file chosen

or drop files here

or paste the contents of your file here

Enter your ASN.1 message to validate.

ASN.1

Source: USDOT.

Question



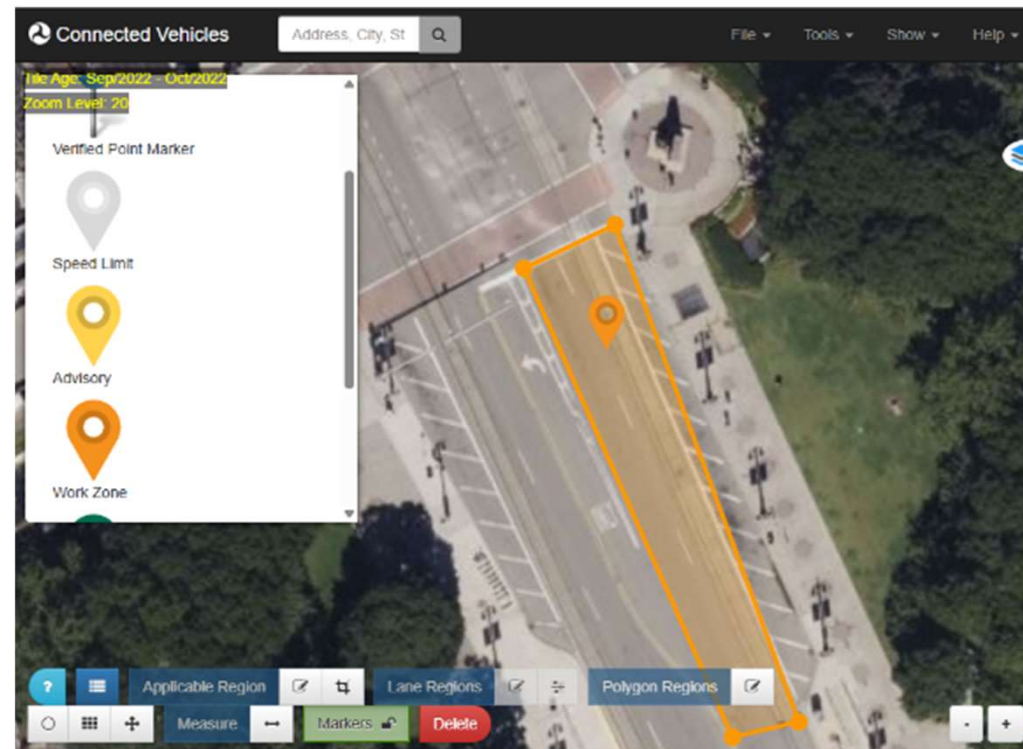
- ▶ What message types do you want to see in the message validator tool?



Coming soon - new TIM tool



- ▶ A GUI to create TIM messages
- ▶ Will be open source and compliant with 2024 version of J2735



Source: USDOT.

Question



- ▶ What ideas do you have for a future version of the TIM tool?

Source: FHWA.



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References

1. Initial image AI generated by Gemini, Google, <https://gemini.google.com/> and modified by ChatGPT, OpenAI, April 16, 2025. <https://chatgpt.com/>
2. Freepik. *Cursor Free Icon*. Flaticon, N.d. https://www.flaticon.com/free-icon/cursor_587335. License at URL listed.
3. Adapted from Kuiper, Peter. *Orthographic Views*. N.d. Diagram. Wikimedia Commons. <https://commons.wikimedia.org/wiki/File:OrthoPerspective.svg>



Questions?



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