Creation of a Guidance Document for MAP Preparation Phase 3

December 3, 2024

CV PFS In-Person Meeting

Reminder about MAP Guidance Revision #3

- Completed March 2024 and posted on the CV PFS webpage
  - https://engineering.virginia.edu/sites/default/files/Connected-Vehicle-PFS/Resources/MAP%20Guidance%20Document%20-%20Revision%203%20FINAL.pdf

- Revision updates
  - Node placement for through lane splits into through lane and turn lane
  - Ongoing monitoring and validation, including the Connected Intersections Message Monitoring System (CIMMS)

Today's Discussion

- Project extended through June/July 2025
- Update on MAP message topics and Issues for Guidance Revisions
- Update on Support in Preparing for Transition from SAE 2735 MAP to SAE 2945/A Road Geometry and Attributes (RGA) Standard

Project Extension

- Goal is to capture more lessons learned to help update the MAP Guidance document
  - V2X Accelerator Grants have initiated
    - Expecting MAP message creation and feedback from those projects
  - Utah SMART Grant project to validate MAP messages wrapping January 15, 2025
    - Has identified a lot about the process of testing, updating, validating MAP messages

- Contract extension through July 2025
  - This will allow more insights from MAP creations
  - This will allow the RGA Transition summaries to occur in 2025

Next Steps for MAP Guidance

Revision #4 anticipated June/July 2025

- Clarification (possible change) of turn or through lanes with wide tapers
- Additional details about testing, modifying, validating MAP messages
- Relationship of security certificates to MAP validation
- Other lessons learned from other CV PFS member deployments:
  - V2X Accelerator Sites (UT, AZ, TX)
  - Ann Arbor / UMTRI
  - Others?

Next Steps for MAP Guidance

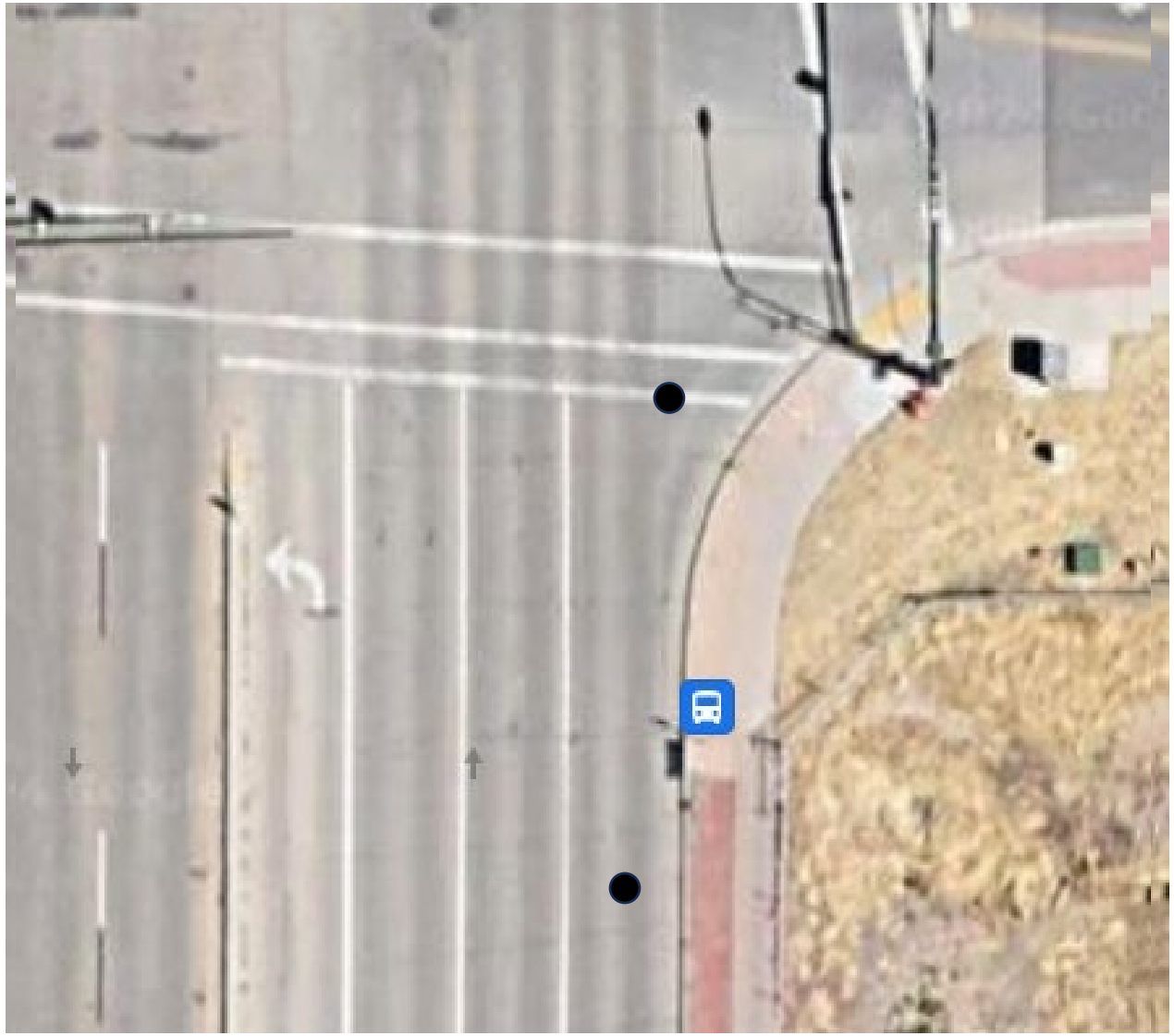
Identified challenge: right lane that is through opens up to an extra right turn lane even though it is not striped as a turn lane.

- Lane width becomes really wide: successive nodes would almost be on top of each other or
- Could create a right turn lane (even though not striped)

Next Steps for MAP Guidance

Approach agreed upon during October 2024 webinar:

Report the lane width at the stop bar, as well as the selected upstream node(s). Less concern now about frequency of nodes to capture lane width changes



Next Steps for MAP Guidance

Approach agreed upon during October 2024 webinar:

Report the lane width at the stop bar, as well as the selected upstream node(s). Less concern now about frequency of nodes to capture lane width changes

OBU Applications will identify the trapezoid bounded by the node and lane widths and properly identify the OBU within the lane

Next Steps for MAP Guidance

Soliciting Inputs for Revision #4

- We are looking for possible changes to the MAP Guidance document from now through next summer
- We invite input from others that are actively creating MAP messages to send any challenges or unique situations
  - Utah
  - Texas
  - Maricopa County
  - Ann Arbor
  - Georgia?
  - Ohio?
  - Other states?

Update on Support CV PFS in Preparing for Transition from SAE 2735 MAP to SAE 2945/A Road Geometry and Attributes (RGA) Standard

Support CV PFS in Preparing for Transition from SAE MAP to SAE RGA Standard

Three Activities

✓Support members' interaction with the RGA development/review process

- Summary of "Impacts of the RGA Transition to Connected Intersection MAP Messages"
  - How will connected intersection RGAs differ from MAP messages?
  - Summary will be a "quick read" document

- Transition Plan from MAP Messages to RGAs
  - Work with SAE and OEMs to understand the plan for MAPs vs RGAs
  - Address questions such as: Should states still be developing MAP messages?

Summary of “Impacts of the RGA Transition to Connected Intersection MAP Messages”

Planning for MAP to RGA Message Transition

- Map data for CV applications will eventually be transitioned from MAP messages to Road Geometry and Attributes (RGA) messages
- SAE J2945/A_202404 RGA is available for download from SAE
- Need confirmation from CV PFS to proceed to next steps
  - Prepare a summary describing impacts of the RGA transition on MAP messages
  - Prepare a preliminary Transition Plan for MAP to RGA

Outline of Potential Impacts

- Description of scope – why the transition from MAP to the RGA specification is needed
- What are the differences between the MAP and RGA messages?
- What might trigger a transition from MAP to RGA?

Comparison of MAP and RGA

- MAP messages in J2735 were built for intersections; RGA extends geometries to other roadway configurations
- The most recent SAE J2735 has a placeholder for RGA J2945/A content
- MAP messages will continue to apply if the message content does not change
- Major differences between MAP and RGA
  - Use of partition to divide content across messages
  - Describing travel paths as “ways” for classes of users, e.g., vehicles, bicycles, pedestrians
  - Rearranging data for controls, e.g., direction of travel, maneuvers
- J2735 and J2945/A (the RGA) are connected
  - J2945/A reuses the root geometry objects (nodes, lanes, ways) from J2735
  - J2945/A covers the data frames reusing the 2735 data elements

Transition from MAP to RGA

- MAP message content can be reused for RGA
- Existing MAP message content will be valid so long as the RSUs support MAP
- RGA preserves the data relationships from MAP for SPaT; SPaT messages are intended to be usable with RGA *(… but need to confirm that has been preserved in the published version)*
- WSA will announce an intersection using MAP or RGA or both

Transition Plan from MAP Messages to RGAs

Anticipated Industry Questions

- Will there be a transition from MAP messages to the RGA, where MAP messages are no longer recognized by OEMs?
- If so, when will it occur?
- Should IOOs pause creating MAP messages?
- What resources will be available to support the transition to RGAs?

Current Thoughts (from various inputs)

- A pilot deployment is anticipated before J2945/A is considered more than recommended practice
- The transition to industry use is unknown
  - Final requirements for SPaT/MAP/RTCM are still underway in the CTIC Project.
  - Similar requirements will be needed for the RGA
  - Possibly 2-5 years before the industry is ready for RGA use
- Don’t pause deploying Connected Intersections to wait for the RGA
  - Data assembled and messages created will not be wasted
- Initial RGA deployments might be non-intersections
  - Curves or work zones
- There will likely be a transition period when both MAP and RGAs are used for intersections

Upcoming Panel Webinars

Occurs the third Friday from 10-11a PT (1-2p ET), as needed

- December 20, 2024
- January 17, 2025
- February 21, 2025