**Coordination Plan for CO Concurrence:**

**Connected Vehicle - Map Messages Clarification Meeting**

* **Standards for guidance**

The standards based guidance for CV is generally found in SAEJ2945. The standard does not include a performance accuracy requirement for GPS coordinates other than stating a GPS coordinate is mandatory. Below is an excerpt from the standard.



Due to the lack of federal guidance we need to develop our own Standards. To determine what that standard should be the University of California Riverside study, *Best Practices for Surveying and Mapping Roadways and Intersections for Connected Vehicle Applications*, will be utilized (<http://www.cts.virginia.edu/wp-content/uploads/2014/04/Mapping-Final-Report-FINAL-20160915.pdf>). The reference includes two different recommendations. Page 12, suggests CV application Accuracy Requirements of 2-3 meter accuracy, some applications will require better than 3 meter accuracy. Page 41, suggests an accuracy of 5 - 10 cm as desired for advanced applications on high definition lane models uses on Advanced Driver Assistant System, Connected Vehicles and Autonomous Vehicles. This standard was originally designed for map databases physically store on Vehicles.

Arterial Accuracy

D5 recognizes while multiple applications are being put into devices as part of project, additional applications will be coming in the coming months/years. The current applications only require 1-3 m accuracy based on the reference, however, preparing for the future and trying to insure pedestrians receive accurate information the team is pursuing a higher level of accuracy. Specifically the district will pursue a ***20 cm Accuracy*** for the project. This accuracy was chosen based on cost feasibility and compatibility with existing data collection equipment and exceeding reference standards.

Arterial Length

Arterial Length of MAP messages. Page 51 of the University of California Riverside study, *Best Practices for Surveying and Mapping Roadways and Intersections for Connected Vehicle Applications* mention a Radius of 60 meters of the center of the intersection. Based on information receive from District 5 consultants the Radius in which the RSU can broadcast is 0.5 miles. The arterial Length to be considered need to address the distance away from the intersection in which Map messages Data will be collected. The district recommend the use of stopping sight distance as a factor to consider when making a determination for the arterial length. If stopping sight distance is greater than midpoint to previous intersection, use the midpoint. Other recommendations are to go back to the turn bay length. Specific intersection geometry as Driveways, obstructions and horizontal alignment (curves) need to be taken into consideration. The level of accuracy depends on the CV applications, District Five recommend to use different level of accuracy depending on application. For the length near crosswalk areas and midblock crossing with CV pedestrian application it is recommended to use a higher accuracy (20 cm accuracy), while lengths further away to cover turn lanes, SSD, etc. will pursue a lower accuracy based on the applications deploy.

Interstate Accuracy

D5 does not recommend putting people in the freeway to collect higher accuracy unless there is a compelling reason. Section 316.130, F.S. indicate that no pedestrian shall walk upon limited access facility(freeway or interstate highway) or ramp connecting a limited access facility to any other street or highway. Since no pedestrian are expected lower accuracy is recommended. The District suggest using Google Earth or USDOT Map Tool.

Future projects on areas with CV technology

Future projects in areas with connected Vehicle technology will have to be updated to indicate changes in geometry. This will include temporary changes due to Temporary Traffic Control as project that will update the geometry on the intersections and/or intersection approaches. Strong consideration for construction activities is recommended, either update Map messages or unplug the CV device to avoid wrong messages during construction. For projects where geometry changes will take place a Technical Special Provision for contractor to update Map messages need to be implement.

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