

Systems Engineering for Intelligent Transportation Systems (ITS) and Connected Automated Vehicle (CAV) Readiness

MnDOT and local public transportation agencies throughout Minnesota continue to develop, deploy, and operate ITS applications including dynamic message signs (DMS), closed-circuit television (CCTV), vehicle detection, communications, and ramp metering. In order to consider current and future interoperability, expansion, and integration of these ITS applications, while also ensuring conformance with 23 CFR 940, an initial step in the project is typically a systems engineering analysis (SEA). Model systems engineering documents can help to support this process and maintain consistency in the overall systems engineering approach for future ITS procurements, as well as, connected automated vehicle readiness statewide.

Project Overview

MnDOT will develop separate model systems engineering documents for five ITS applications (DMS, CCTV, vehicle detection, communications and radio, and ramp metering). Each model systems engineering document will contain a Concept of Operations, System Requirements, and Test Plan specific to the ITS application. Once completed, these documents will serve as independent documents for use in other MnDOT districts or by other city and county transportation agencies, except for the Ramp Metering which is anticipated to be used as a resource for MnDOT only. These systems engineering documents will then be used as ITS applications are planned, procured, and deployed, allowing the project team implementing the application to modify and tailor the documents, as necessary, to meet their specific needs while ensuring consistency and conformance of 23 CFR 940. Another key aspect to this project will be the documentation of CAV readiness for each ITS application. For this process, interdependencies between the ITS application and CAV technologies and applications will be identified (e.g. defining how the ITS application may benefit from CAV, defining how CAV deployments may benefit from the ITS application, and defining constraints and dependencies between each).

Project Deliverables

- Concept of Operations, System Requirements, and Test Plans for five (5) ITS applications: DMS, CCTV, vehicle detection, communications and radio, and ramp metering;
- Inclusion of CAV readiness assessment results for each ITS application.

Project Partners

- MnDOT Office of Connected and Automated Vehicles (CAV-X)
- MnDOT Regional Transportation Management Center (RTMC)
- MnDOT Districts
- Minnesota City and County Transportation Agencies
- Athey Creek Consultants

For more information visit mndot.gov

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