ITS Implementation for CAV Readiness

The goal of this project is to enhance the MnDOT ITS Implementation Process. The ITS Implementation Process provides guidance and assistance to MnDOT Districts statewide scoping and project development processes to fulfill the implementation requirements of 23 CFR 940 for all ITS projects or projects with an ITS component.

Figure 1. ITS Implementation Process

Project Description

This project includes:

- Updating the Existing Systems Engineering documents (Concept of Operations, Requirements and Test Plans) for Classes A, B-1 and B-2 applications, including incorporation of connected and automated vehicle (CAV) concept and applications.
- Incorporating additional programmatic Systems Engineering efforts into the ITS Implementation Process.
- Updating the Highway Project Development Process (HPDP) – ITS Systems Engineering Requirement.
- Enhancing the ITS Implementation Process and supporting materials, including the ITS Decision Tree, ITS Project One-Paper, ITS Implementation Tools and Resource Guide, a Quick Reference Guide, and ITS Checklists.
- Creating ITS Checklists for additional ITS applications, including DMS, video, traffic detection, ramp meters, radio communications, flood warning systems, slippery pavement warning systems, reduced visibility warning systems, and dynamic curve warning systems.
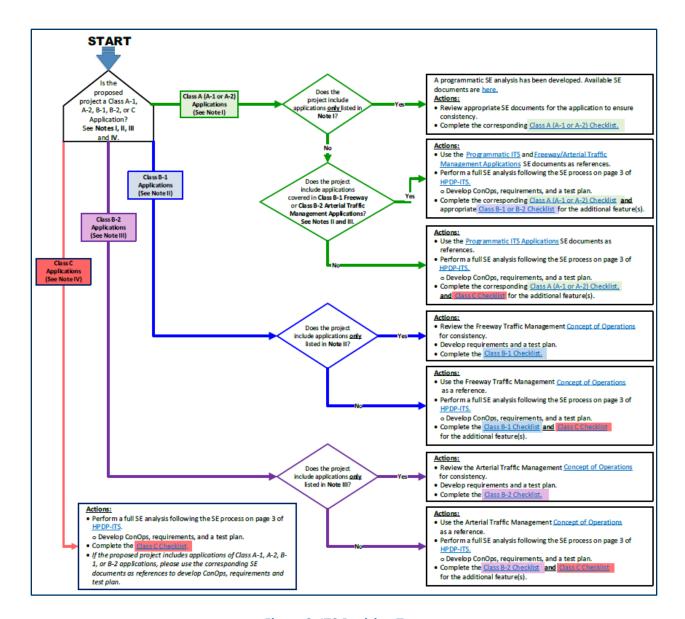- Providing on-going maintenance and enhancements to the ITS Implementation Process and support materials.

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Is the proposed project a Class A-1, A-2, B-1, B-2, or C Application? See Notes I, II, III and IV.

Class A (A-1 or A-2) Applications (See Note I)

Class B-1 Applications (See Note II)

Class B-2 Applications (See Note III)

Class C Applications (See Note IV)

Does the project include applications only listed in Note I? — Yes →

A programmatic SE analysis has been developed. Available SE documents are here.
Actions:
- Review appropriate SE documents for the application to ensure consistency.
- Complete the corresponding Class A (A-1 or A-2) Checklist.

No ↓

Does the project include applications covered in Class B-1 Freeway or Class B-2 Arterial Traffic Management Applications? See Notes II and III. — Yes →

Actions:
- Use the Programmatic ITS and Freeway/Arterial Traffic Management Applications SE documents as references.
- Perform a full SE analysis following the SE process on page 3 of HPDP-ITS.
  - Develop ConOps, requirements, and a test plan.
- Complete the corresponding Class A (A-1 or A-2) Checklist and appropriate Class B-1 or B-2 Checklist for the additional feature(s).

No →

Actions:
- Use the Programmatic ITS Applications SE documents as references.
- Perform a full SE analysis following the SE process on page 3 of HPDP-ITS.
  - Develop ConOps, requirements, and a test plan.
- Complete the corresponding Class A (A-1 or A-2) Checklist, and Class C Checklist for the additional feature(s).

Does the project include applications only listed in Note II? — Yes →

Actions:
- Review the Freeway Traffic Management Concept of Operations for consistency.
- Develop requirements and a test plan.
- Complete the Class B-1 Checklist.

No →

Actions:
- Use the Freeway Traffic Management Concept of Operations as a reference.
- Perform a full SE analysis following the SE process on page 3 of HPDP-ITS.
  - Develop ConOps, requirements, and a test plan.
- Complete the Class B-1 Checklist and Class C Checklist for the additional feature(s).

Does the project include applications only listed in Note III? — Yes →

Actions:
- Review the Arterial Traffic Management Concept of Operations for consistency.
- Develop requirements and a test plan.
- Complete the Class B-2 Checklist.

No →

Actions:
- Use the Arterial Traffic Management Concept of Operations as a reference.
- Perform a full SE analysis following the SE process on page 3 of HPDP-ITS.
  - Develop ConOps, requirements, and a test plan.
- Complete the Class B-2 Checklist and Class C Checklist for the additional feature(s).

Actions:
- Perform a full SE analysis following the SE process on page 3 of HPDP-ITS.
  - Develop ConOps, requirements, and a test plan.
- Complete the Class C Checklist.
- If the proposed project includes applications of Class A-1, A-2, B-1, or B-2 applications, please use the corresponding SE documents as references to develop ConOps, requirements and test plan.

Figure 2. ITS Decision Tree

Benefits

The project provides the following benefits:

- Ensure compliance with federal requirements and eligibility for federal funds
- Leverage technology maturity and readiness to better position for CAV technology deployment
- Improve regional coordination and collaboration for implementation and operations of ITS
- Enhance financial effectiveness
- Foster integration of ITS deployment
- Promote proper consideration of interoperability and future expansion needs

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