 Intelligent Transportation Systems (ITS)   
Systems Engineering Analysis Worksheet

This worksheet, or a document with the same information, must be completed for all federal aid projects that include Intelligent Transportation Systems (ITS) elements. This worksheet must be completed prior to submitting a construction authorization request and must be kept in the project file for the entire document retention period of the project. If Concept of Operations, System Requirements, Verification Plan, and Validation Plan documents are required for the project, as determined by this worksheet, these documents must be submitted to the WSDOT Local Programs Engineer for review, who in turn will send them to the FHWA ITS/Operations Engineer for review, prior to submitting a construction authorization request. The documents must be kept in the project file for the entire document retention period of the project.

1. Project Name: Click here to enter text.
2. Project Number (if known): Click here to enter text.
3. Total project cost (includes preliminary engineering/design, right of way, and construction phases):

Click here to enter text.

1. Amount of total project cost for ITS elements: Click here to enter text.
2. Select which of the following items, if any, apply to this project:

The project implements an existing adaptive signal control technology (ASCT) system for the first time. Or the project expands on an existing ASCT system involving jurisdictions the agency has not worked with previously. Please explain why you selected or did not select this item.

Click here to enter text.

The project includes new and unproven hardware and/or communications technology that is considered “cutting edge” or not in common use. This could include custom developed or unproven commercial-off-the-shelf (COTS) technology that has not been used by the agency previously. Please explain why you selected or did not select this item.

Click here to enter text.

The project will add new software that will be custom developed for this project or will make major modifications to existing custom developed software. Please explain why you selected or did not select this item.

Click here to enter text.

The project will add new interfaces to systems operated or maintained by other agencies. Please explain why you selected or did not select this item.

Click here to enter text.

The project will develop new system requirements or require revisions to existing system requirements that are not well understood within the agency and/or well documented at this time. These system requirements will be included in a request for proposal, or plans, specifications, and estimate bid document package. Therefore it will require significant stakeholder involvement and/or technical expertise to develop these items during the project delivery process. Please explain why you selected or did not select this item.

Click here to enter text.

Multiple agencies will be responsible for one or more aspects of the project design, construction, deployment, and/or the ongoing operations and maintenance of the system. Please explain why you selected or did not select this item.

Click here to enter text.

1. If you selected any of the items in question 5, FHWA and WSDOT consider the project to be high risk. Use this table for additional requirements:

|  |  |  |
| --- | --- | --- |
| **Total project cost for high risk ITS projects** | | |
| **Adaptive signal control technology (ASCT) projects** | **Other types of ITS projects** | |
| **Greater than or equal  to $1,000,0002** | **Less than $1,000,0002** |
| Additional systems engineering documents (Concept of Operations, System Requirements, Verification Plan, and Validation Plan) 1 are required. | Additional systems engineering documents (Concept of Operations, System Requirements, Verification Plan, and Validation Plan) 1 are required. | Additional systems engineering documents (Concept of Operations, System Requirements, Verification Plan, and Validation Plan)1 are recommended.. This decision requires FHWA concurrence through the WSDOT Local Programs Engineer prior to submitting a construction authorization request. |
| **Notes:**   1. See definitions in Section 41.3. 2. Use the amount from question 4. | | |

1. What is the name of the regional ITS architecture and which portions of the architecture will be implemented? Is the project consistent with the architecture? Are revisions to the architecture required? Also, which user services, physical subsystem elements, information flows, and market/service packages will be completed, and how will these pieces be part of the architecture?

Click here to enter text.

1. Identify the participating agencies, their roles and responsibilities, and the concept of operations. For the elements and market/service packages to be implemented, define the high-level operations of the system. This includes where the system will be used, its performance parameters, its life cycle, and which agency will operate and maintain it. Discuss the established requirements or agreements on information sharing and traffic device control responsibilities. The regional ITS architecture operational concept is a good starting point for discussion.

If this is a high risk project and a more extensive Concept of Operations document is being prepared for this project (see question 6), this answer can be a simple reference to that document.

Click here to enter text.

1. Define the system requirements. Based on the concept of operations, define the “what” and not the “how” of the system. Define the detailed requirements for eventual detailed design. The applicable high-level functional requirements from the regional architecture are a good starting point for discussion. A review of the requirements by the project stakeholders is recommended.

If this is a high risk project and a more extensive System Requirements document is being prepared for this project (see question 6), this answer can be a simple reference to that document.

Click here to enter text.

1. Provide an analysis of alternative system configurations and technology options to meet requirements. This analysis should outline the strengths and weaknesses, technical feasibility, institutional compatibility, and life cycle costs of each alternative. The project stakeholders should have had input in choosing the preferred solution.

Click here to enter text.

1. Identify procurement/contracting options. Since there are different procurement methods for different types of projects, the decision regarding the best procurement option should consider the level of agency participation, compatibility with existing procurement methods, the role of the system integrator, and life cycle costs. Some options to consider include consultant design/low-bid contractor, systems manager, systems integrator, task order, and design/build.

If the ITS portions of the project significantly meet the definition of construction, construction by low-bid contract would be used. Non-construction ITS portions of the project, such as services for software development, systems integration, systems deployment, systems management, or design, will be either engineering or service contracts. In these cases, a qualifications-based selection (QBS) or best value procurement may be more appropriate. For guidance on procurement options for ASCT systems, refer to Pages 15-20 of USDOT’s [*Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems*](https://ops.fhwa.dot.gov/publications/fhwahop11027/index.htm), FHWA‑HOP-11-027, August 2012.

Click here to enter text.

1. Identify the applicable ITS standards and testing procedures. Include documentation on which standards will be incorporated into the system design. Also include justification for any applicable standards not incorporated. The standards discussion in the regional architecture is a good starting point for discussion.

Click here to enter text.

1. Outline the procedures and resources necessary for operations and management of the system. In addition to the concept of operations, document any internal policies or procedures necessary to recognize and incorporate the new system into the current operations and decision-making processes. Also, resources necessary to support continued operations, including staffing and training must be recognized early and be provided for. Such resources must also be provided to support necessary maintenance and upkeep to ensure continued system viability.

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