

1 Introduction

New York State Transportation Agencies are pioneers and strong supporters of the National ITS Standards program, and have implemented standards related to most areas of Intelligent Transportation Systems (ITS). Fortunately for the National ITS Standards program, their experience has helped to shape, develop, fine-tune, and provide lessons learned for other agencies with regard to ITS Standards deployment. The New York State has shown a strong commitment to ITS Standards and has implemented a wide range of standards, gaining valuable experience in the process.

Today, however, New York State Transportation Agencies are asking:

- What is our strategy regarding ITS standards moving forward?
- How do we better program ITS projects?
- How do we capture the lessons learned and experience of the “first generation projects” and apply them to the next generation of projects?
- How do we move from proof-of-concept, early deployment, small scale or laboratory environment projects to large ITS deployments? And, what are the risks involved?
- What testing and/or certification strategy should we implement to make sure that large deployments go smoothly?

The goal of this report is to help answer these questions, identify key processes and key ITS standards, and present a strategy to support future deployments and testing.

1.1 Report Overview

A major step in the deployment of ITS systems is the development of design documents and procurement specifications. The project development process for the State of New York includes: project scoping, review of alternative designs, and the development of plans, specifications, and estimates (PS&E).

The exact details and steps to procure ITS may differ from agency to agency within the State of New York, but the general process is similar. However, this technical issue paper focuses on the project development process adopted by NYSDOT.

Capital transportation projects in the State of New York follow a specific project development process. The process consists of:

- **Project Initiation Stage** – where projects are evolved from an identified transportation problem or need;
- **Project Scoping Stage** – where the project limits, requirements and design are identified;

- **Project Design Stage** – where the details of the projects are determined and documented in the form of a plans, specifications and estimates (PS&E) submittal; and,
- **Project Construction Stage** – where the project is built and implemented.

This report is organized around these project development process stages, as follows:

INTRODUCTION

- **Chapter 1: Introduction.** This chapter includes an introduction to the major topics covered in this report and organization.
- **Chapter 2: ITS Standards Deployments in New York State.** Includes a review of significant ITS projects in New York State that have implemented ITS standards.
- **Chapter 3: ITS Standards Deployment and Testing Strategies.** Contains an assessment of current ITS deployments using the ITS standards and develops a strategy and recommendations for future ITS deployment.

PROJECT INITIATION

- **Chapter 4: The Role of Regional ITS Architecture in Project Programming.** Reviews the relationship between the regional ITS architecture and the transportation planning process in the State of New York.

PROJECT SCOPING

- **Chapter 5: Developing Concept of Operations and Requirements.** Covers the topics of 1) documenting user needs and concept of operations, and 2) developing use cases and requirements.
- **Chapter 6: ITS Communications Framework and Alternatives Analysis.** Provides an overview of a proposed New York State ITS communications framework based on the key ITS standards. In addition, an example shows how to use the key standards and framework in developing ITS project communications alternatives.
- **Chapter 7: Project Scoping and Design Report / Systems Engineering Analysis.** Includes an overview of the scoping and design reports, information contents of an systems engineering analysis report, and their relation. A fully elaborated example system engineering report is included in the appendices.

PROJECT DESIGN

- **Chapter 8: ITS Standards Specification Development.** This section describes the information content required for ITS Standards in the Final Design stage of the project development process. The appendices include example specifications for center-to-field and center-to-center communications.

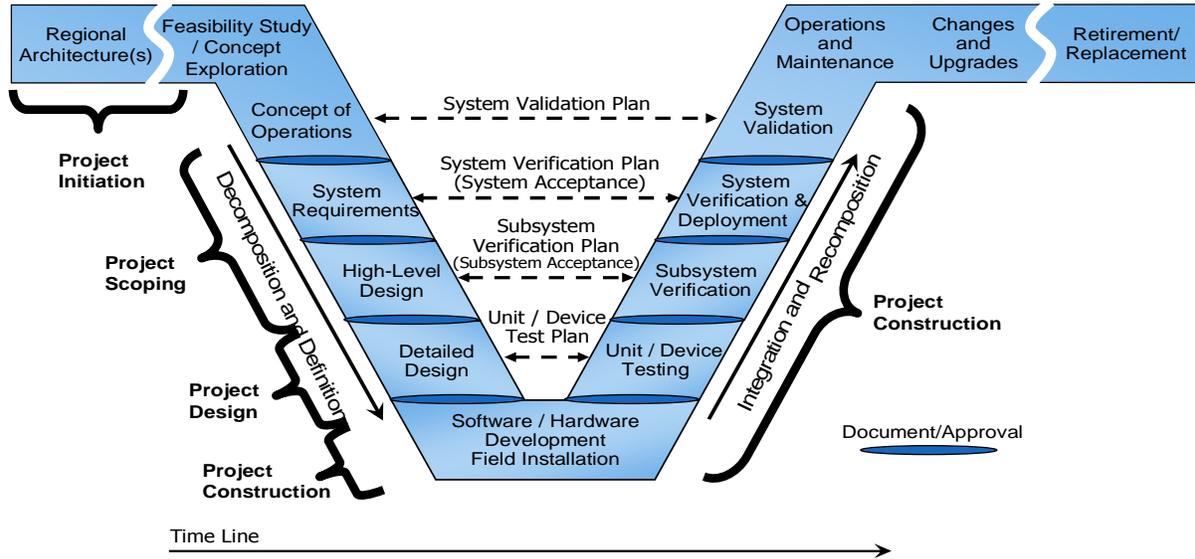
PROJECT CONSTRUCTION

- **Chapter 9: ITS Standards Specification Catalog and Testing Framework.** Provides an overview of the considerations for New York State in developing and adopting an ITS Standards Catalog of Specification and Testing Framework.
- **Chapter 10: Literature and Materials Review.** Provides a listing and summary of sources reviewed in preparation of this guide.

1.2 Role of Systems Engineering in ITS Project Development

A systems engineering methodology is discussed and used throughout because of its strength as a project management and quality control tool. The systems engineering process is an iterative approach to technical management, system design, product realization, and technical evaluation, which progresses through a series of steps leading to a preferred system solution. The figure below shows a representation of the systems engineering process called the VEE diagram. The project development phases (project initiation through project construction) are shown along side of the VEE. Scoping, design and specification development progress down the left side of the VEE, while construction, testing and validation proceed up the right side.

Figure 1-1. Integrating the Systems Engineering into the NYSDOT Project Development Process



A detailed example ITS project timeline (schedule) is shown in Appendix B.