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# 1 INTRODUCTION

## 1.1 Purpose

This guide is intended to introduce you to systems engineering and provide a basic understanding of how it can be applied to planning, designing, and implementing intelligent transportation systems (ITS) projects. The guide leads you step by step through the project life cycle and describes the systems engineering approach at each step. It describes how to begin implementing the systems engineering approach on your next ITS project and incorporate it more broadly into your organization's business processes and practices.

Reading this guide will make you conversant in systems engineering and familiar with the way that it is being applied to ITS projects today. It won't make you a systems engineering expert. Many excellent and comprehensive resources are available that describe every aspect of systems engineering in detail. These resources are identified throughout the guide in case you want more information.

This document is a resource and a learning tool on the topic of systems engineering. **It is not formal guidance from US DOT on how to meet the systems engineering requirements in FHWA Rule 940 and the FTA National ITS Architecture Policy.** Compliance with the Rule/Policy is actually established by each FHWA Division and FTA Regional Office. It is strongly recommended that you contact your federal representative for the specific requirements in your state.

## 1.2 Intended Audience

This guide is designed for ITS project managers, system owners, operators, maintainers, and anyone else in need of a quick, approachable primer on the basics of systems engineering for ITS. We assume you have a transportation background and know something about ITS, but you don't need any previous knowledge of systems engineering to benefit from this guide.

You might have noticed that systems engineers are not included in the above list. The intended audience is not systems engineers, since they should already be familiar with the information in this guide. The guide is intended for all the other transportation professionals who are involved in ITS project development and will need to know something about systems engineering to ensure that it is correctly and productively applied to their projects.

## 1.3 Navigating the Document

This document includes seven chapters that are organized to introduce you to systems engineering and then to describe how systems engineering can be applied to your ITS projects.

Here is a breakdown of the six remaining chapters and what you will find in each:

**Chapter 2: Why Use Systems Engineering?** provides some motivation for reading the rest of the document. It briefly explains why systems engineering should be used for ITS projects and gives some background on the FHWA Rule and FTA Policy requirements for systems engineering.

**Chapter 3: What is Systems Engineering?** sets the stage for the following chapters by defining some key terms and explaining the guiding principles behind systems engineering. The "V" model that adorns the cover of this document is introduced here.