• INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE, ENGINEERING PROCESSES & STANDARDS



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Introduction

An intelligent transportation system succeeds or fails long before the first camera is mounted. It depends on whether the architecture was drawn properly, whether the engineering process followed a documented lifecycle, and whether the interfaces used agreed standards. Many deployments skip those steps, buy several good products, and then discover the components cannot exchange data. This Intelligent Transportation Systems Architecture, Engineering Processes & Standards Training Course gives ITS architects, systems engineers, and project managers the discipline to avoid that outcome. Participants learn architecture development, requirements and interface definition, systems engineering lifecycle, standards conformance, testing and verification, and configuration management.

Intelligent Transportation Systems Architecture, Engineering Processes & Standards Course Objectives

- Develop a regional ITS architecture using the US National ITS Architecture and FRAME.
- Define user services, functional requirements, and interfaces precisely.
- Apply the systems engineering V-model across the ITS project lifecycle.
- Write and manage requirements with traceability to design and tests.
- Apply interface standards: NTCIP, DATEX II, GTFS, TMDD, and TMC referencing.
- Design for interoperability, modularity, and open interfaces.
- Plan verification, validation, and field acceptance testing.
- Apply configuration management and change control to ITS assets.
- Assess cybersecurity, privacy, and resilience in the architecture.
- Prepare technical specifications, procurement documents, and conformance statements.

Course Methodology

- Facilitated sessions built on real ITS architectures, specifications, and test plans.

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- Workshops developing architecture views and interface definitions.
- Requirements writing and traceability matrix exercises.
- Standards conformance and specification review labs.
- Group exercise on a procurement-ready ITS specification and test plan.

Who Should Take This Course

- ITS architects and systems engineers.
- Transport technology project managers.
- Traffic engineering and network design specialists.
- Systems integrators and vendor technical staff.
- Transport authority technical and standards officers.
- Quality, verification, and assurance engineers.

Intelligent Transportation Systems Architecture, Engineering Processes & Standards Course Outlines

Day 1: ITS Architecture and Framework Development

- The US National ITS Architecture and its reference structure.
- FRAME architecture and the European approach.
- User services, market packages, and service packages.
- Regional architecture development process and stakeholder roles.
- Architecture views: functional, physical, and communications.
- Architecture maintenance and governance over time.
- Aligning architecture with national policy and funding programmes.

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Day 2: Requirements Engineering and Interfaces

- Stakeholder needs to user requirements to system requirements.
- Writing verifiable, unambiguous, and traceable requirements.
- Functional decomposition and allocation to subsystems.
- Interface definition between centre, field, and vehicle layers.
- Interface control documents and data dictionaries.
- Requirements traceability matrices and change management.
- Managing requirements across multiple suppliers.

Day 3: Systems Engineering Lifecycle and Standards

- The systems engineering V-model from concept to retirement.
- Concept of operations development.
- Preliminary and detailed design processes.
- Standards overview: NTCIP, DATEX II, GTFS, TMDD, and SAE J2735.
- TMC location referencing and geographic data standards.
- Conformance, certification, and interoperability testing.
- Openness, modularity, and avoiding vendor lock-in.

Day 4: Verification, Validation, and Acceptance

- Verification versus validation and where each applies.
- Test strategy, cases, and environments: lab, field, and simulation.
- Factory acceptance testing and site acceptance testing.
- Field commissioning, integration, and cutover planning.
- Defect logging, retest, and closure discipline.

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- Cybersecurity and resilience testing for roadside systems.
- Documentation for handover and operational readiness.

Day 5: Configuration, Asset, and Programme Management

- Configuration management and baseline control.
- Version control, release notes, and documentation updates.
- Asset management for ITS equipment across the lifecycle.
- Obsolescence planning and technology refresh cycles.
- Procurement routes, technical specifications, and evaluation criteria.
- Contract management for ITS delivery and warranty.
- Building a standards-driven ITS engineering roadmap.

Conclusion

By successfully completing the Intelligent Transportation Systems Architecture, Engineering Processes & Standards Training Course, participants will have acquired a thorough working knowledge of ITS architecture development, requirements and interface engineering, the systems engineering lifecycle, interface and data standards including NTCIP, DATEX II and GTFS, verification and validation practice, configuration and asset management, and procurement-ready specification writing. They will leave able to design ITS projects that interoperate by design, evidence conformance, and manage suppliers through a controlled engineering process. Gentex Training Center delivers this programme with systems engineering and ITS practitioners working on live deployments.

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FAQs for the Intelligent Transportation Systems Architecture, Engineering Processes & Standards course

Q1 What is the "Intelligent Transportation Systems Architecture, Engineering Processes & Standards" course about?

It is a five-day programme on the design discipline behind ITS deployment. It covers architecture framework development, requirements and interface engineering, the systems engineering lifecycle, interface and data standards, verification and validation, configuration and asset management, and procurement specifications.

Q2 What are the key benefits of the "Intelligent Transportation Systems Architecture, Engineering Processes & Standards" course?

Participants design systems that interoperate instead of failing at the integration stage, hold suppliers to verifiable requirements and traceable evidence, and avoid vendor lock-in through open interfaces and standards. They also produce specifications and test plans that stand up during procurement and acceptance.

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Q3 What skills will I gain from the "Intelligent Transportation Systems Architecture, Engineering Processes & Standards" course?

You will gain ITS architecture framework development, requirements and interface engineering, systems engineering lifecycle and standards conformance application, and verification, validation, configuration, and asset management.

Q4 What tools, methods, or standards are covered in the "Intelligent Transportation Systems Architecture, Engineering Processes & Standards" course?

The course works with the US National ITS Architecture and the FRAME architecture, user services, market packages and service packages, regional architecture development, architecture views covering functional, physical and communications layers, stakeholder to system requirements engineering, verifiable and traceable requirement writing, functional decomposition and allocation, interface control documents and data dictionaries, requirements traceability matrices, the systems engineering V-model, concept of operations development, preliminary and detailed design processes, the standards NTCIP, DATEX II, GTFS, TMDD and SAE J2735, TMC location referencing and geographic data standards, conformance and interoperability testing, factory acceptance testing and site acceptance testing, field commissioning and cutover planning, defect logging and retest discipline, cybersecurity and resilience testing, configuration management and baseline control, obsolescence and technology refresh planning, and procurement technical specifications with evaluation criteria.

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Q5 How is the "Intelligent Transportation Systems Architecture, Engineering Processes & Standards" course applied in real-world practice?

Teams apply it when writing a technical specification for a traffic management centre, defining interfaces between a signal system and a traveller information platform, running factory acceptance tests before delivery, managing a change request across two suppliers, planning an equipment refresh cycle, and preparing a conformance statement for procurement.