SPEC INNOVATIONS
DEVELOPERS OF INNOSLATE

WHITEPAPER

ISO 26262 AND THE SYSTEMS ENGINEERING V-MODEL

Chris Howard | chris.howard@specinnovations.com

About SPEC Innovations

Systems and Proposal Engineering Company, dba SPEC Innovations was founded in 1993 by Dr. Steven Dam. The company has worked on significant architecture and systems engineering projects for the DoD, DOE, and other government and commercial organizations. Learn more at www.specinnovations.com.

We began the development of Innoslate in 2010 when we found it challenging to do the work we needed to do with the limited tools available at the time. Innoslate was first released in 2012 on the cloud and is currently in version 4.7 as a full lifecycle tool, with integrated Systems Engineering and Program Management capabilities. It uses the open standard, Lifecycle Modeling Language (LML), as its open ontology.

Innoslate currently supports users around the world and is also available on NIPRNET, SIPRNET, and C2S, as well as behind your own firewalls. You can learn more about Innoslate by going to our website, www.specinnovations.com/innoslate.

Executive Summary

ISO 26262 is an international standard aimed at ensuring the functional safety of automotive electrical and electronic systems. It provides a framework for managing safety throughout the entire lifecycle of these systems, from concept through decommissioning.

Key Points

- ISO 26262 addresses potential hazards caused by system malfunctions.
- It encompasses the entire lifecycle of automotive systems.
- Adherence to ISO 26262 ensures compliance with safety regulations, enhances vehicle safety, and builds consumer trust.

"Innoslate simplifies ISO 26262 implementation, ensuring comprehensive safety and compliance for modern automotive systems."

Introduction

Background

The automotive industry increasingly relies on complex electronic systems essential for vehicle functionality and safety. With the rise of autonomous driving and advanced driver-assistance systems (ADAS), the need for stringent safety standards has never been greater.

Objective

This whitepaper aims to provide an in-depth understanding of ISO 26262 and demonstrate how Innoslate, a powerful MBSE tool, facilitates compliance with this standard. It will explore the standard's framework, requirements, and practical implementation strategies using Innoslate.

Explanation of ISO 26262

Overview of Standard

ISO 26262 is structured around a safety lifecycle, which includes the management, development, production, operation, and decommissioning phases. It emphasizes the importance of identifying and mitigating risks to ensure the functional safety of automotive systems.

V-Model Framework

SE-V Mapping

The systems engineering Vee model (known as the SE-V) is a project lifecycle management process that aligns with the ISO 26262 lifecycle, ensuring that development and validation activities are systematically planned and executed. Figure 1 below showcases the high-level processes of the systems engineering V.

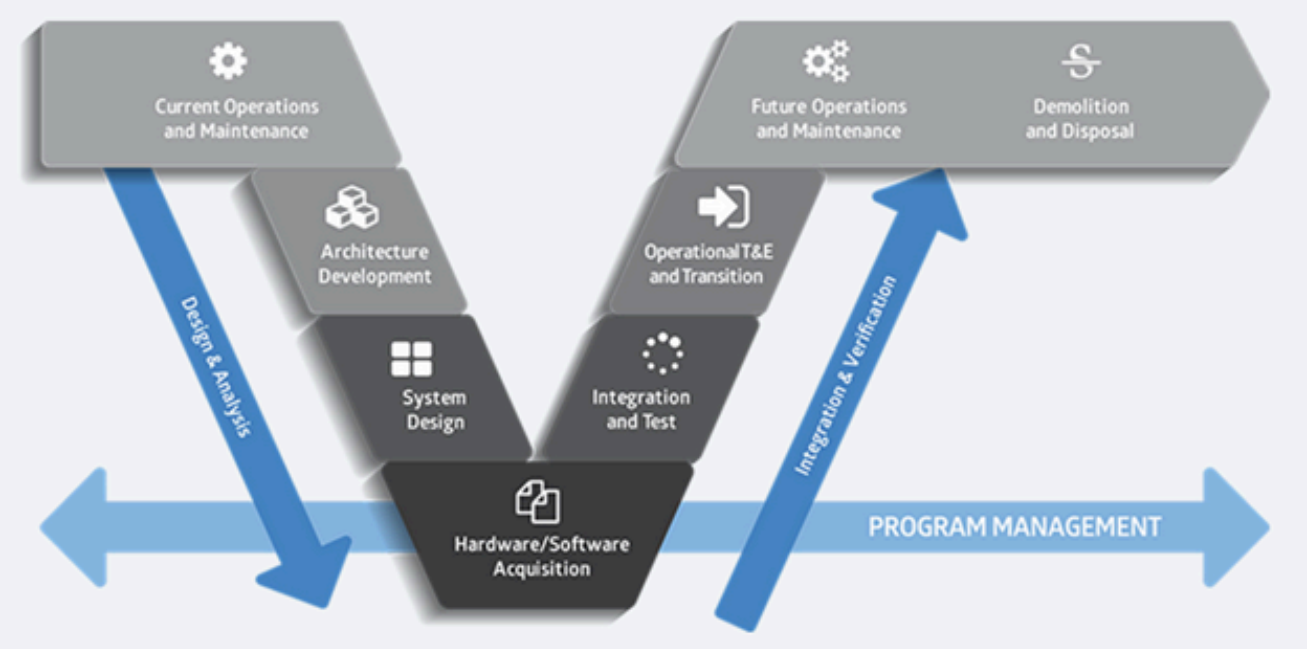

Figure 1: V-Model (High Level)

The V-Model framework maps system development (on the left side of the V) to system validation and verification (on the right side of the V). This ensures that each development phase has corresponding testing and validation activities.

ISO Standards and the V-Model

The V-Model framework integrates development and testing activities, ensuring a systematic approach to system engineering. It aligns with ISO 26262 by mapping each development stage to specific verification and validation steps.

Implementation of V-Model as It Pertains to ISO Standards

- **Concept Phase:** Hazard analysis and risk assessment (HARA) to identify potential safety issues.
- **System Design Phase:** Developing a functional safety concept and deriving technical safety requirements.
- **Implementation Phase:** Executing the design, focusing on adherence to safety protocols.
- **Verification and Validation Phase:** Conducting rigorous testing and validation to ensure compliance with safety requirements.

Innoslate Implementation of ISO Compliance

Innoslate offers a comprehensive suite of features designed to support ISO 26262 compliance, including:

- Requirements Management: Capturing and managing safety requirements throughout the project lifecycle.
- System Modeling: Developing detailed system models to ensure all safety requirements are addressed.
- Verification and Validation: Facilitating rigorous testing and validation processes.
- Documentation: Ensuring comprehensive documentation and traceability of all processes and decisions.

Figure 2 below shows a quick summary of the capabilities of Innoslate using the V-Model. Innoslate can be used at each step to assist in compliance with any standard.

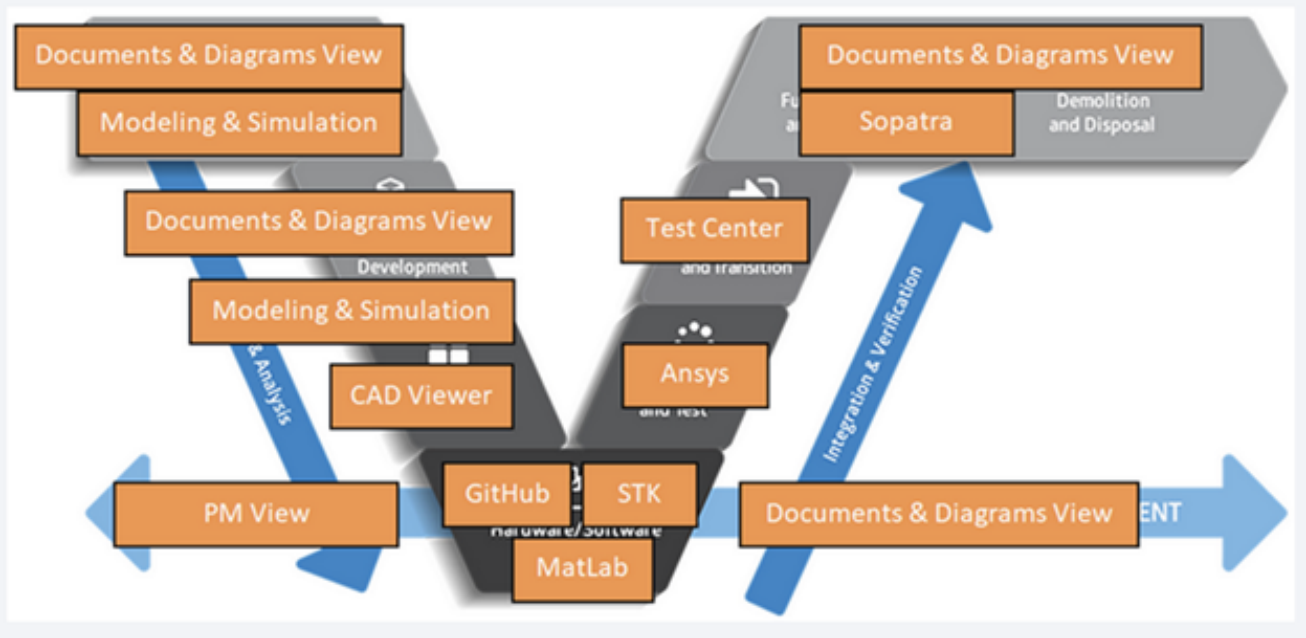

Figure 2: V-Model (Innoslate Application)

Conclusion

Recap of ISO 26262

ISO 26262 is a vital standard for ensuring the functional safety of automotive systems, covering the entire lifecycle from concept to decommissioning.

Recap of Implementation of ISO 26262 Using Innoslate & V-Model

Using Innoslate in conjunction with the V-Model framework, organizations can streamline the implementation of ISO 26262. Innoslate's comprehensive features support requirements management, system modeling, and rigorous validation processes, ensuring thorough compliance and enhanced vehicle safety.

Glossary

Term	Definition
ISO 26262	International standard for functional safety of electrical and electronic systems in production automobiles.
Functional Safety	The safety aspect of a system or equipment that ensures correct operation in response to inputs.
Hazard Analysis and Risk Assessment (HARA)	Process to identify and assess potential hazards and their risks.
Model-Based Systems Engineering (MBSE)	Approach to systems engineering that uses models to support the development lifecycle.

References

International Organization for Standardization. (2018). ISO 26262: Road vehicles - Functional safety. ISO.

Jones, P. (2019). Model-Based Systems Engineering with Innoslate. Vitech Corporation.

Pimentel, E., & Walkowski, S. (2020). Implementing Functional Safety in Automotive Systems. Springer.

Smith, D. J., & Simpson, K. G. L. (2021). Functional Safety: A Straightforward Guide to Applying ISO 26262. Elsevier.

Williams, K. (2019). Automotive Functional Safety: ISO 26262 and Beyond. Wiley.