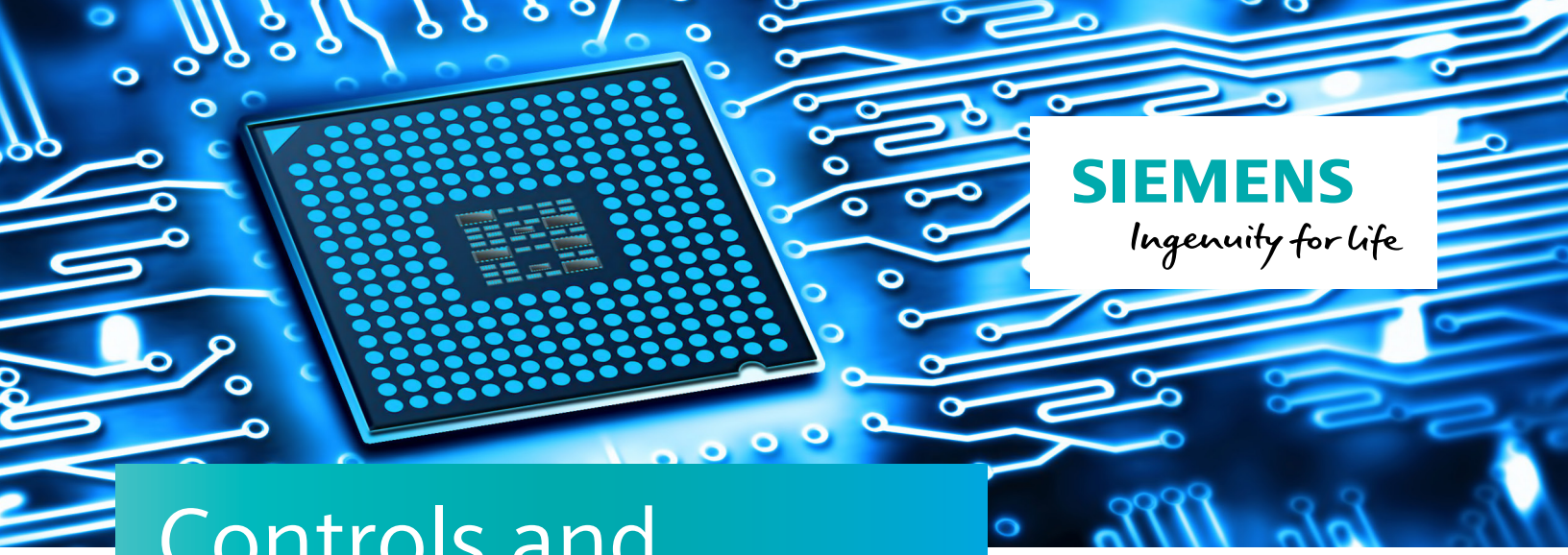

SIEMENS
Ingenuity for life

Controls and mechatronics engineering solutions

Transform your ADAS, electrification and powertrain controls development with the latest algorithms, practices and technology

Benefits

- Jump start adoption of advanced controls technologies like deep learning, sensor fusion, and optimal control for industrial applications
- Increase your confidence in ADAS, electrification, powertrain controls quality using Siemens know-how and enterprise solutions
- Understand your company's EE and software practices in comparison to industry practices to identify improvement opportunities
- Define a roadmap to institutionalize best practices in your organization through a combination of tools and services
- Iteratively transform your organization and track your progress against key performance indicators

State of the industry

To stay ahead in today's fast-growing global market, companies are under competitive pressure to develop cutting-edge products that are more engaging and less expensive.

To achieve these goals, engineers apply mechatronic solutions to develop breakthrough products with brand-differentiating functionalities. These solutions use electronics and software with advanced controls to optimize the performance and efficiency of systems.

Successful companies that deliver high-quality smart products accomplish this using Model-Based Systems Engineering (MBSE). MBSE enables you to effectively balance performance, complexity and quality while addressing and conforming to government regulations and industry standards (e.g. ISO 26262).

While MBSE has many benefits, companies often struggle to adopt MBSE and institutionalize practices that deliver these benefits.

Siemens experience and technology

Siemens Digital Industries Software has a proven track record of successfully delivering tools and services, integrating test and simulation in mechanical and controls development for smart systems design.

As a technology innovator and partner for the European Commission, Siemens funds research programs supported by its engineers who have devised and successfully deployed state-of-the-art control algorithms, verification and validation methods.

For example, we provide highly skilled engineering experts who actively assist in developing and deploying functionally safe and reliable control system features throughout all phases of the development process. To industries, we apply processes and methods in accordance with the ISO 26262 standard to verify the functionality of customers' controls systems and their safety measures.
services

Controls and mechatronics engineering solutions

Controls business transformation
Siemens Digital Industries Software's project experience has unique insight into the state of MBSE for controls. Our engineers can assess a company's controls capabilities against best practices and industry standards. This analysis delivers valuable insight into development gaps that can be addressed by a combination of process improvement and technology advancement.

This offering helps you develop a value roadmap which lays out a multi-year deployment plan based on return-on-investment (ROI) analysis to prioritize and schedule process and tool changes. Deliverables can include:

- As-is state of controls practices
- Industry benchmark report with comparison across MBSE dimensions
- Detailed transformation plan with value, cost, timelines and ROI
- Transformation sprints aligned to plan are supported by Siemens engineers and consultants.

Controls and embedded software quality
Traditional verification and validation (V&V) techniques are time-consuming and expensive because they rely mostly on physical prototypes available late in the development cycle. This offering focuses on virtualizing the V&V process, taking advantage of simulation and data management to:

- Understand, define and verify system and subsystem requirements
- Assure controller performance in the context of the overall system
- effectively identify issues and resolve them early in the process
- define, execute and report on verification activities
- Manage and execute change

Siemens supports customers by executing a range of engineering and consulting activities including requirements engineering, test case development, test platform setup (XiL), test execution, analysis, troubleshooting and reporting.

Engineering processes are automated, and artifacts managed with an application lifecycle management (ALM) solution customized for controls that is delivered as part of the project execution.

Controls system development
In addition to supporting V&V for controls and software development, Siemens can support enhancements to existing or new controls using model-based design (MBD) methodologies in following areas:

- Baseline powertrain electrification functions for energy efficiency and multi-attribute balancing
- Implementation best practices that promote re-usability, testing and good code generation
- Model and verification framework that facilitates virtual development and testing
- Setup and deployment of ALM environment to manage controls artifacts and automate workflows

Siemens Digital Industries Software's project team will actively work alongside our customers to deliver in-production software.

Advanced controls technology
Siemens software prototyping services help customers adopt advanced controls technology using MBD methodologies. Our expertise includes areas such as optimal controls, sensor fusion and deep learning for advanced driver assistance systems (ADAS) and powertrain electrification.

Siemens advanced controls services offerings include the full range of engineering activities from algorithm conception through implementation. Typical project deliverables include:

- White box application layer
- Embedded software
- Reference electronics
- Development environment including simulation, design and data management tools

For more information contact CONTROLS.plm@siemens.com or the services manager in your country.

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