Trending for product safety features in Automotive field

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Agenda

- Standard Process Introduction
- Why should implement automotive process?
- Process Implementation Strategy: SUCCESS
- How to make the product to be safer
- Product Safety for Sustainable Automotive Development

Standard Process Introduction

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- What is V-model
- Important Automotive V-model standards

Standard Process Introduction

- The foundation of the company: QMS
  - Quality Management System (QMS) drives quality, efficiency, compliance, and customer satisfaction for sustainable growth.
  - Standards: ISO9001, IATF16949, VDA6.3

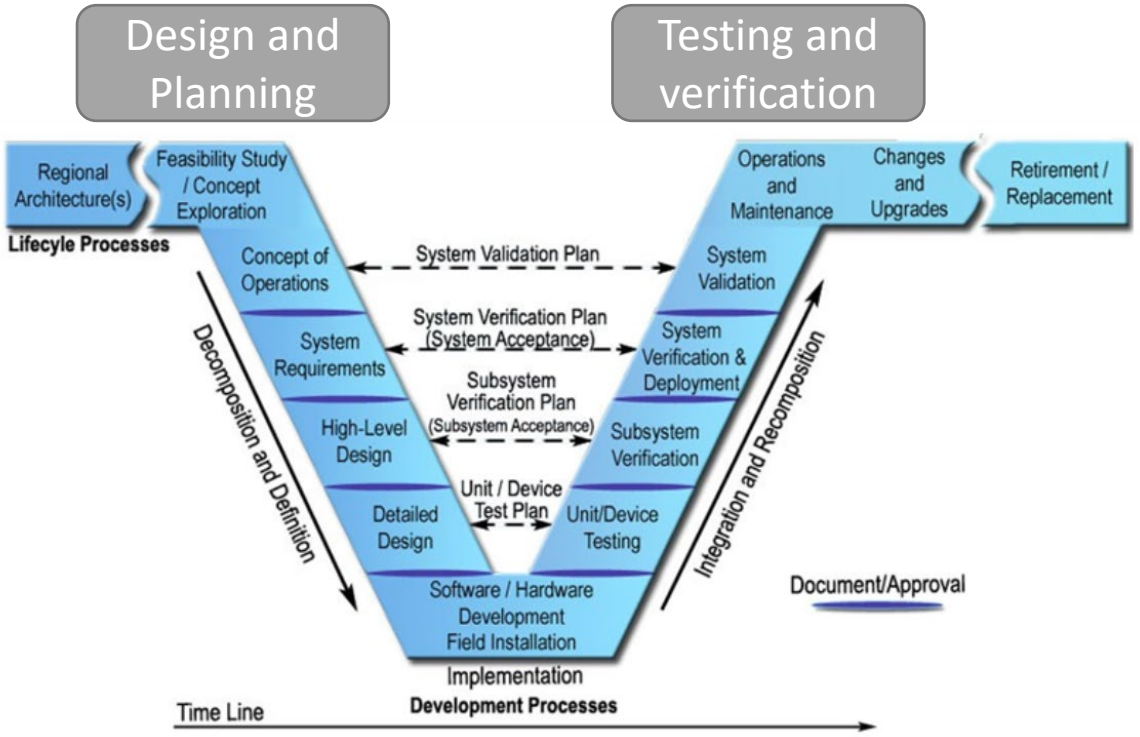
- Automotive Field Important Regulations: V-Model
  - In the automotive industry, compliance with critical regulations is essential to ensure safety, quality, and market access.
  - V-models: ASPICE, ISO26262, ISO21434

AUTOMOTIVE SPICE®

ISO International Organization for Standardization

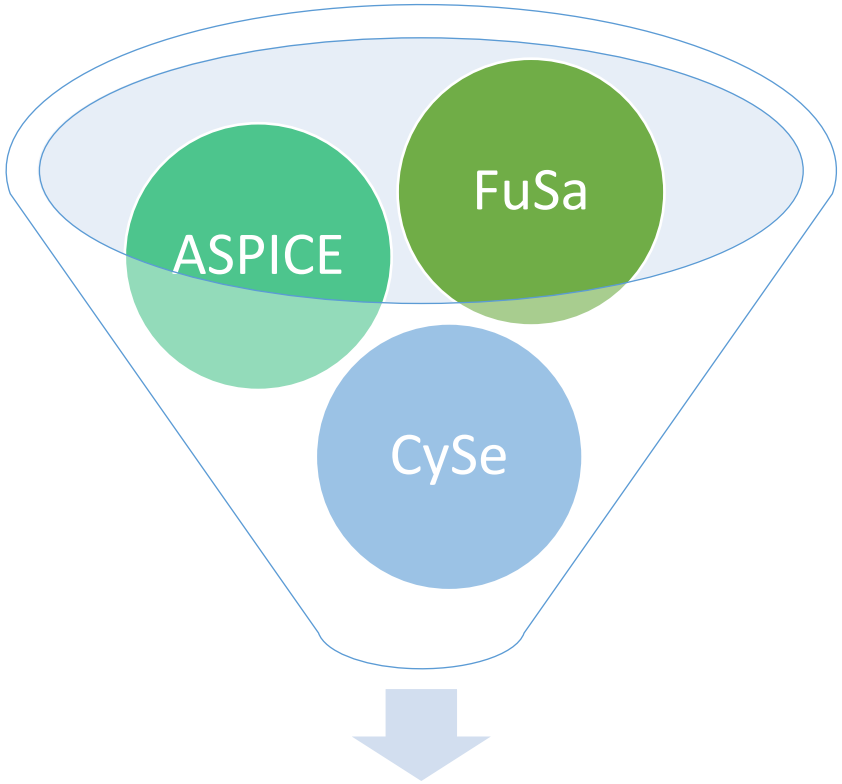
What is “V-model”?

- The V Model links design with verification to ensure quality and system, hardware or software integrity through early planning and validation.
- Essence of V-Model
  - System Thinking
  - Verification & Validation Pairing
  - Early Test Planning
  - Error Containment
  - Clear Phase & Responsibilities



Important Automotive V-model standards

- **ASPICE**: Improves **system/ hardware/ software process** maturity and consistency.
- **Functional Safety (ISO26262)**: Ensures functional safety of **automotive electronic systems**.
- **Cyber Security (ISO/SAE 21434)**: Manages cybersecurity risks against network and **software threats**.



Automotive Platform Total Solution

Why should implement automotive process?

- Automotive Field Market Trends
- Why Process Systems Are Often Resisted
- Why Process Systems Eventually Prevail
- Why AI Robotics Needs Automotive-Grade ICs

Automotive Field Market Trends: ASPICE

- ASPICE (Levels 2/3) are usually perceived by clients as the universal standards for excellence.

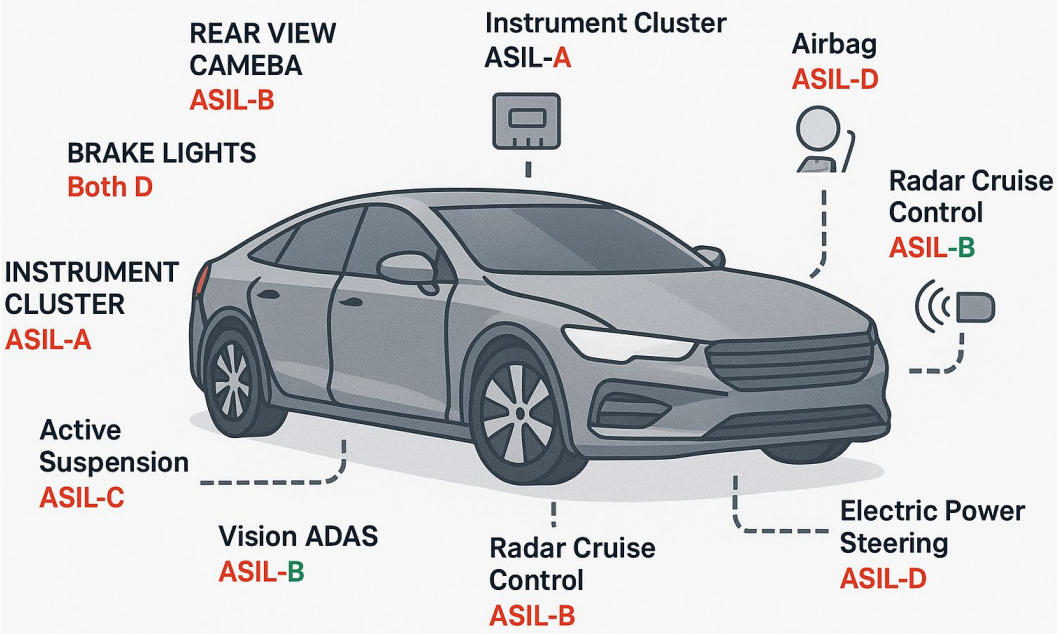
Company	ASPICE	Company	ASPICE
VW Group	CL3	Harman	CL2 or CL3
BMW	CL3	Toyota	CL2 or CL3
Mercedes-Benz	CL3	Honda	CL2 or CL3
Volvo	CL3	GM	CL2 or CL3
Continental	CL3	Nissan	CL2 or CL3
Bosch	CL3	Hyundai/ Kia	CL2
Ford	CL3	Stellantis	CL2

Level 0	**Incomplete –** The process is incomplete and fails to achieve its purpose. (No attributes)
Level 1	**Performed –** Process is implemented and allows to achieve its purpose. (Process Performance)
Level 2	**Managed –** Process is managed, and work products are planned, controlled and maintained (Performance Management, Work Product Management)
Level 3	**Established –** Process is used based on standard rules set across organisation (Process Definition, Process Deployment)
Level 4	helps to achieve targeted goals within defined limits. (Process Measurement, Process Control)
Level 5	**Optimising –** Process is continuously improved and changed to meet important business goals. (Process Innovation, Process Optimisation)

Build Automotive Process in Company

Automotive Field Market Trends: Functional Safety

- FuSa (ISO26262): Automotive Safety Integrity Level (ASIL) is the basic requirement for the system element.



Type	Severity	Exposure	Controllability	Risk Level
ASIL D	Severity (S3)	Frequent to high	Difficult to control (C3)	High
ASIL C	Moderate to severe (S2-S3)	Low to high (E1-E4)	Difficult to control (C3)	Significant
ASIL B		Low to medium (E1-E3)	Normally controllable	Moderate
ASIL A	Light (S1)	Easily controllable	Easily controllable	Low

Why Process Systems Are Often Resisted

- **The challenge of process setup is not its importance, but its low urgency.**

Project Priority (Development First)

Not enough Resource

- **Missed deadlines**
- **Constant rework**
- **Incomplete or unstable delivery**
- **Burn-out teams**

- **Need to output a lot of work products for certification**

Heavy Documentation Load

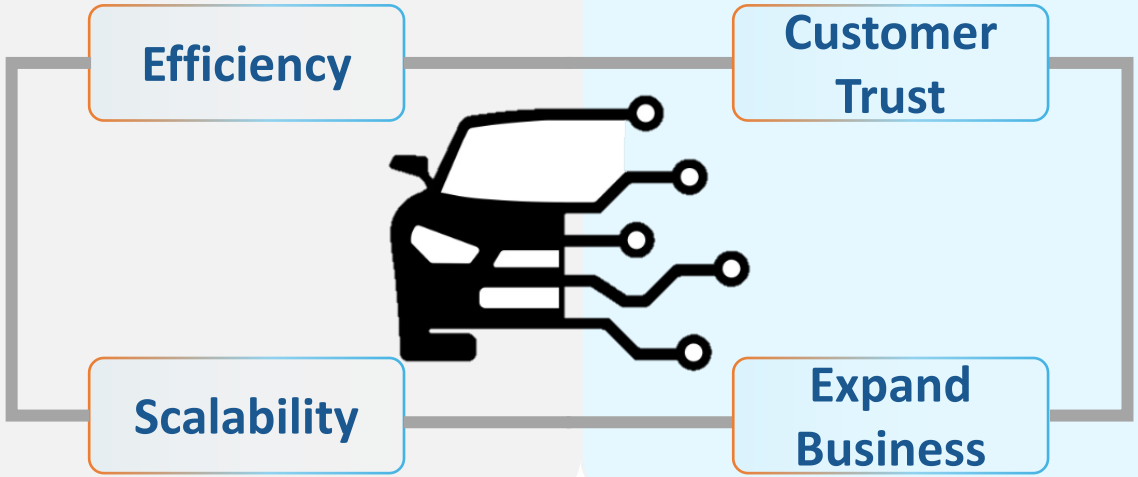
Narrow Market Applicability

- **High cost so only can use in Narrow Market**

Why Process Systems Eventually Prevail

For Company View

- Standardized processes
- Handover smoothly
- Easy for project transitions
- Compliance (ASPICE, Functional Safety, Cybersecurity)



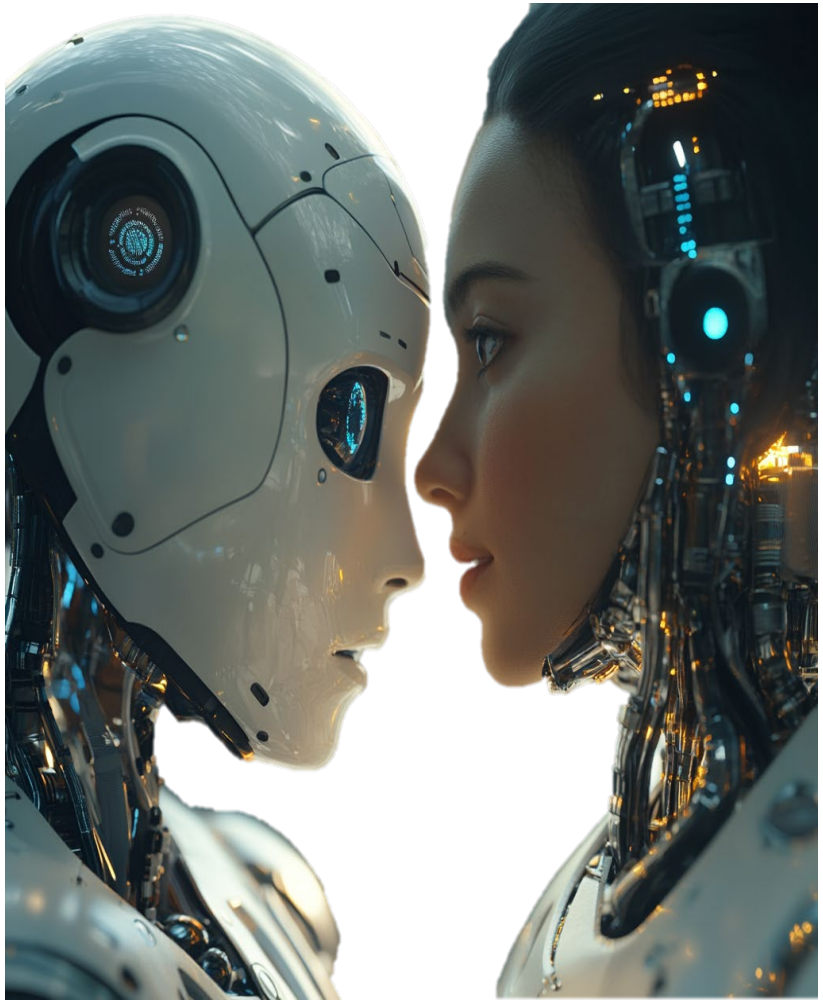
For Marketing View

- Reliable delivery earns trust
- Open doors to earn new business

New Opportunities: AI Robotics

Why AI Robotics Needs Automotive-Grade ICs

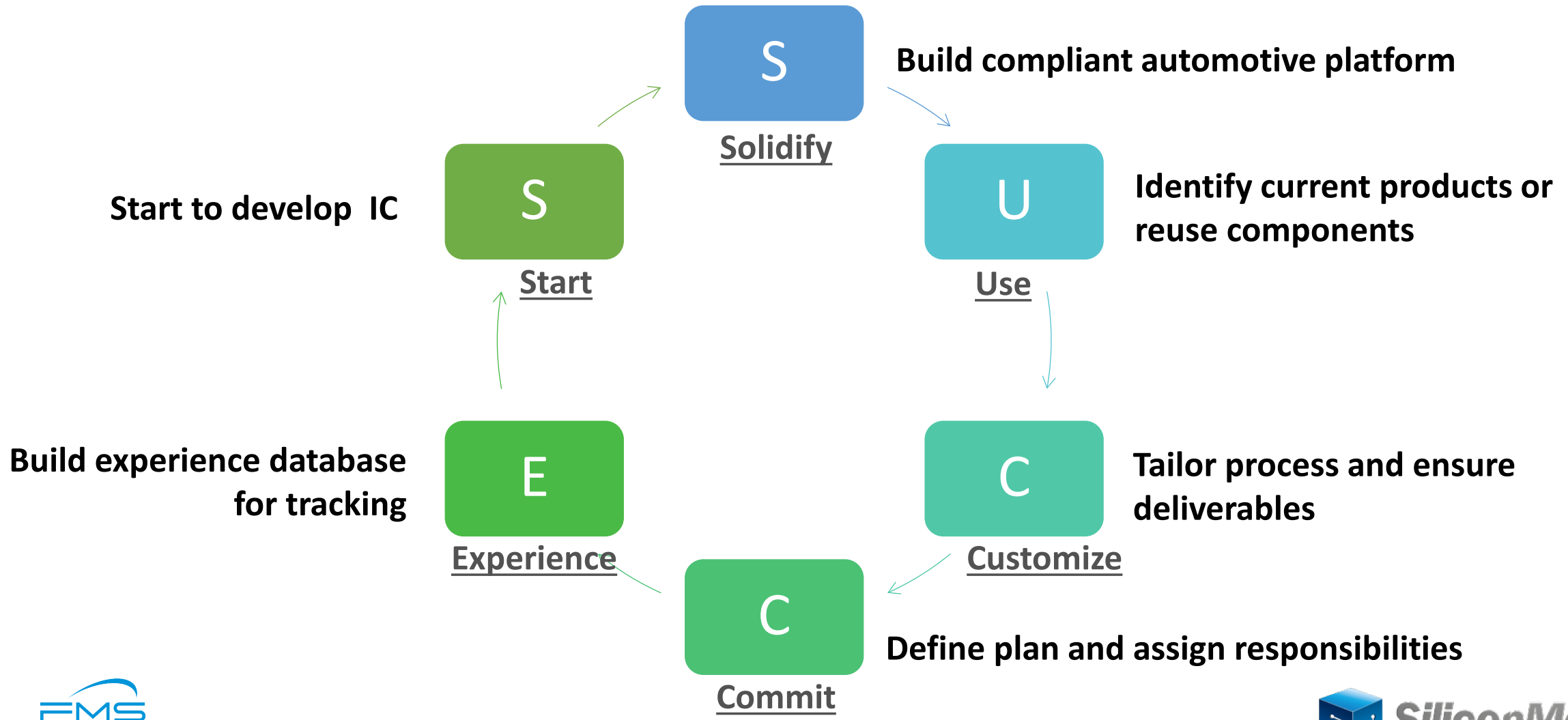
Reliability	Automotive ICs withstand heat, vibration, and extreme conditions—ideal for robots working outdoors or in factories.
Functional Safety	ISO 26262-compliant ICs enable safer robot control, especially for autonomous or semi-autonomous machines.
Long Lifecycle	AI robots need long-term IC availability—automotive ICs ensure stable supply for 10+ years.
Real-Time Performance	Automotive SoCs/MCUs support deterministic timing and real-time control, essential for motion and perception tasks.
Cybersecurity	Modern automotive ICs integrate secure boot, hardware encryption, and ISO/SAE 21434 features.



Process Implementation Strategy

- From Strengths and Weaknesses to Process Strategy: SUCCESS

SUCCESS: From Strengths and Weaknesses to Process Strategy



How to make the product be safer

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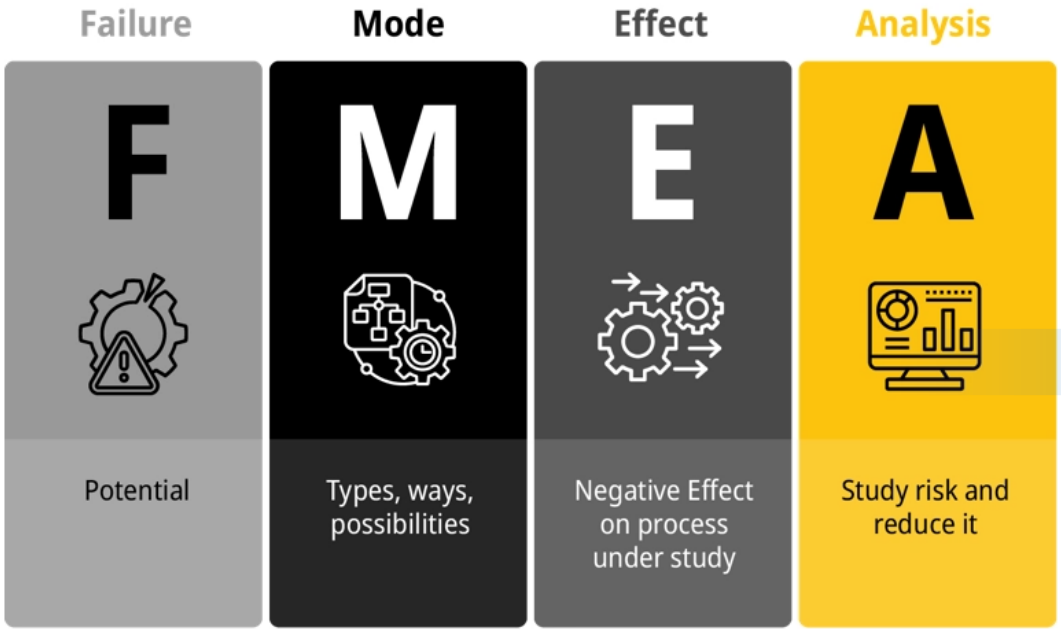
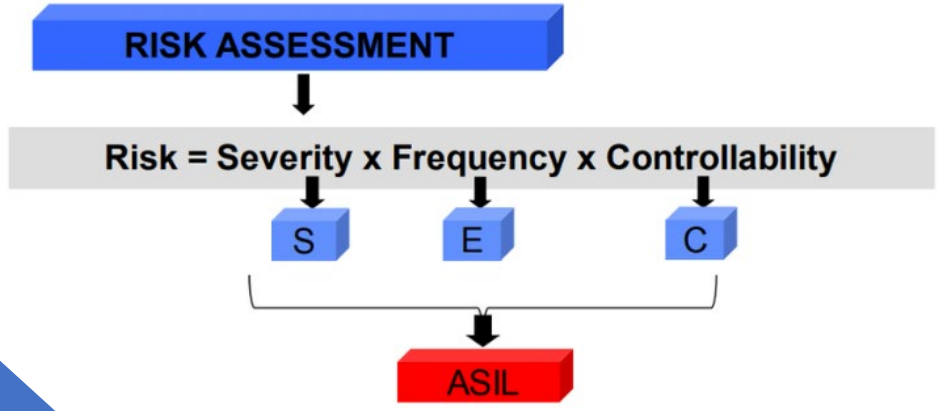


Functional Safety

FMEDA

Failure Mode Effects and Diagnostic Analysis



ASIL- Automotive Safety Integrity Level

- Set up **"Safety Goal"**.
- Design **"Safety mechanism"** to reduce the permanent fault and random fault.
- Add **"Error injection"** to increase the ASIL value.

How to make the product be safer

- Detect and avoid contributing to **corruption of data**
- Detect and avoid contributing to **access of wrong data**
- Detect and avoid contributing to **loss of data or access of old data**

Safety Mechanism	ECC for SRAM	LDPC decode fail	E2E fail detection	CRC detection
Error Injection for Safety Mechanism	**Software based self test with SRAM ECC error**	**Software based self test with LDPC decode fail**	-	-

Product ASIL READY

Product Safety for Sustainable Automotive Development

Autonomous driving requires **Safety Mechanism** protection of data and integrity of devices to avoid the failure occurs.

Follow **Automotive Development Process** to design the new product.

Silicon Motion's automotive storages
provide the solutions to support various applications.

Functional Safety and **Cyber Security** are key elements of autonomous and connected vehicles.

Company Automotive Culture has established and keeps to communications.

Scan to learn more!

Meet us at booth

#315

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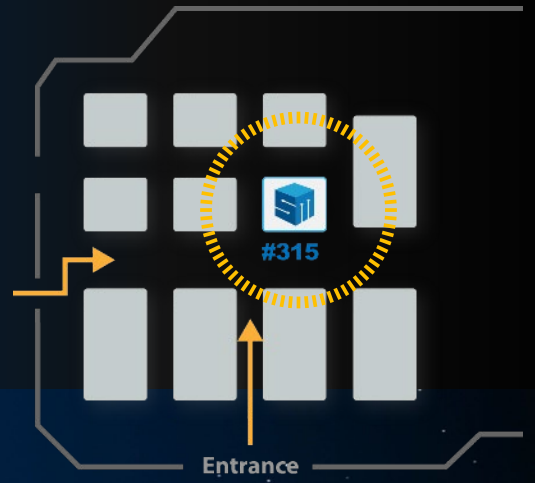

Smart Storage in Motion: From Silicon Innovation to AI Transformation Across all Spectrums!