

LLECS2024 BELGIUM 5-6 December



Software defined Vehicle of the Future Initiative - Overview

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European Commission and Industry took on the challenge







European Vehicle of the Future Initiative

€ 250 million investment for 2023-2024 by the EU, Member States, and the industry







A common Vision and Roadmap for a European driven SDV SW Platform



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Ch	ange History	

🗳 Software

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SW-Defined Vehicle of the Future (SDVoF)

Pre-competitive collaboration between all major European OEMs and suppliers to promote modular, open-source SW with HW-agnostic interfaces towards improved maintainability, portability, and faster time-to-market

Relevant Open Source Eco-Systems







Strong Commitment from Automotive Industry:

ECS2024

Declaration of the European Automotive Manufacturers and Suppliers



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Defined Roadmap for the Implementation of the European driven SDVoF Software platform









SOAFEE

AUTOSAR

European driven "Software-defined-Vehicle of the Future" Initiative









European driven



"Software-defined-Vehicle of the Future" Initiative







European driven



"Software-defined-Vehicle of the Future" Initiative









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HAL⁴SDV-Project

Andreas Eckel, TTTech Computertechnik AG 2024-12-05





HAL⁴SDV Change of USPs

Vision of a Concept with Maximum Flexibility:

a) Free configurable, flexible concept,

combining different modules resulting in an embedded system partly using Service oriented Architecture

b) Enables open-source and IP approach, combining both worlds, non-differentiating, non- safetyrelated open-source and differentiating, safety-related IP

c) Offers differentiating solutions for each OEM at maximum communality: Platforms, Service Modules & all SW components can freely be selected on the supplier's market and composed to one unique, embedded, in-vehicle system







HAL⁴SDV in a Nutshell

Coordination: Andreas Eckel, TTTech Computertechnik AG

Project Office: Armengaud Innovate GmbH

50 Partners:

- **5 OEMs** (Renault/Ampere, BMW, Mercedes, Ford Otosan)
- 6 Tier 1 (Valeo-FR, ETAS/Bosch, CONTI, ZF, AVL-AT, AVL-DE)
- **5 semiconductor manufacturers** (IFAG, NXP-NL, NXP-FR, NXP-CZ and ST-I)
- 8 Software and Technology providers (TAAG, TCAG, Sysgo-DE, EB-DE, 3DS, CSW, TAES, TADE)
- **9 SMEs** (StatInf, RES, ROVI, STTech, Tensor, TERA, TrustInSoft, DIMECC and Unikie)
- **16 academic partners and research institutes** (CEA, CSIC, FZI, VIF, TUM, USTUTT, UniMore, ISEP, KIT, Polimi, Polito, Unibo, TUE, TUOstrava, UOULU, INRIA)
- **1 Foundation:** Eclipse
- 3 Affiliated Partners: UniCA, Sysgo-FR, NXP-FR

9 Associate Partners: Forvia, BSC, DLR, Volvo, FH-IKS, ARM, TUB, VDA, TWT

11 Countries: Austria, Check, Germany, Finland, France, Italy, Lithuania, Portugal, Spain, Turkey,

Project Start/Duration: 2024-04-01/36 months

Total Budget: ~ €64,5 Mio

EC Contribution: ~ €17,8 Mio













HAL⁴SDV Structure









HAL⁴SDV Content Overview

Building Block Activities									
A HW/SW Abstraction	B API and Interface	C Mixed-Criticality Integration Platform	D Cyber Security Orchestration	E Development Process Tools	F Integration, Testing & Simulation				
 A01 HW Abstraction - Hypervisor A02 Middleware besides AUTOSAR Adaptive A03 Communication Middleware (DDS and other solutions) A04 Defragmentation of Interfaces A05 Interface Concept for Service Oriented and Signal- Oriented Functions A06 Data Architecture for Automotive A07 Container/isolation for com- plex Applications (like HMI) 	 B01 DSS - Vehicle Signal Specification B02 Efficiently Integrating B03 Mapping for Internationalization B04 Plug & Charge accord ISO Standards availa as Open Implementat 	C01 On-board Integration SW Environment DV C02 SoA for On-board Inte- gration SW Environment C03 Mixed-Criticality Timing and scheduling On-board Integration SW Environment Shared-Memory access for On-board Integration SW Environment C05 Virtualization Service for On-board Integration SW Environment	 D01 Security Threat Analysis D02 On-board Security Service Gateway SW Cloud Connectivity: D03 Security Service Integration to On-board Integration SW Environment 	 E01 Linux Ecosystem f Safety E02 Memory Safe Lang for Critical System Open tool for archi Modelling following Model-based-syst engineering Appro Overall Vehicle De 	for F01 Tooling for Performance guages 15 Tool Interoperability in Automotive SW dev. Area F03 Software Testing on Integration - Level F04 Virtualisation for Vehicle Subsystems F05 Reprocessing / Replay Simulation				
	Enabler Activitie	s	Definition Activities						
G Software Maintenance & Updateability H Open Source		n Source	I Mindset & Ecosystem J C		Governance				
G01 Isolation of Applications G02 Sustainable Maintenance		Blueprints for Compliance with EU Ilations (e.g.: cyber security)	I01 Define and Show "Automotive Grade"		J01 Process Mapping: CRA Compliance with OSS J02 Supply Chains Open-Source Governance Model				







HAL⁴SDV Expected Impact

- 1) Building a European Eco System: reduce critical mass
- 2) Enhance green- & digital- transformation:
 - Reuse & use longer mechanical vehicle HW
 - "New cars" by SW updates & enhancements/new functions
 - Drive "circularity"
- 3) Enhance/stimulate research & innovation
- 4) Stimulate open source for product implementation
- 5) Accelerate market uptake of technologies







Thank you for your Attention

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