



HAL4SDV

Systems Safety Security Software

Hardware Abstraction Layer for a European Software Defined Vehicle Approach

D1.2 – Report on the Cooperation with the CSA FEDERATE

TTTech Computertechnik AG

03.04.2026



Deliverable		D1.2 – Report on the Cooperation with the CSA FEDERATE
Work Package(s)	1	
Task(s)	T1.2: CSA “FEDERATE” cooperation and interface	
Dissemination Level	Public	
Due Date	2026-03-31	
Actual Submission Date	2026-04-03	
WP Leader	Bayerische Motoren Werke Aktiengesellschaft (BMW)	
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Document History		
Revision	Date	Description
V0.1	10.02.2026	Initial version
V0.2	17.03.2026	WP internal review completed, ready for PSB review
V0.3	26.03.2026	Reviewed version, ready for PGA review
V1.0	03.04.2026	PGA review comments incorporated, version for submission

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Acknowledgement

The project is co-funded by the Chips Joint Undertaking (Chips JU) and National Authorities under grant agreement n° 101139789.



Co-funded by
the European Union



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Table of contents

1	Summary.....	7
1.1	<i>Introduction: HAL4SDV (https://www.hal4sdv.eu/)</i>	7
1.2	<i>Executive Summary.....</i>	9
2	The Sherpa Governance Group Meetings.....	11
3	European Connected and Autonomous Vehicle Alliance (ECAVA)	11
4	Joint Events with FEDERATE	12
4.1	<i>FEDERATE Meetings with dedicated HAL4SDV contributions.....</i>	12
4.1.1	<i>HiPEAC 2025, Barcelona, 2025-01-20 to 21</i>	12
4.1.2	<i>Convergence Conference, Munich, Germany, 2025-02-07.....</i>	13
4.1.3	<i>Malaga Connect, Malaga, Spain, 2025-09-03&04.....</i>	13
4.1.4	<i>Convergence Conference, Brussels, Belgium, 2025-10-06 and 07.....</i>	14
4.1.5	<i>DG-CNECT Meeting Brussels, Belgium, 2025-12-15.....</i>	14
4.2	<i>The Autonomous and Spotlight Session, Vienna, 2025-09-24</i>	14
4.3	<i>E.S.B.S. Conference 2025, Graz, Austria 2025-10-09</i>	15
4.4	<i>EF ECS, Malta, 2025-12-03&04.....</i>	16
4.5	<i>HiPEAC 2026, Krakow, 2026-01-26to28.....</i>	17
4.6	<i>Brokerage Event, Brussels, 2026-02-03 to 06</i>	18
4.7	<i>RTR 2026, Brussels, 2026-02-10 to 12</i>	18
4.8	<i>FEDERATE (https://federate-sdv.eu/)</i>	19
4.8.1	<i>SOAFEE (https://www.soafee.io/)</i>	20
4.8.2	<i>COVESA (https://covesa.global/)</i>	21
4.8.3	<i>Shift2SDV (Project is to be started, Website does not yet exist)</i>	21
4.8.4	<i>AUTOSAR (https://www.autosar.org/)</i>	21
4.8.5	<i>Eclipse SDV (https://sdv.eclipse.org/).....</i>	22
4.8.6	<i>Soft-D-Car (https://sofdcar.de/language/en/).....</i>	22
5	Support of the FEDERATE Building Block (BB) Repository.....	22
6	Joint FEDERATE HAL4SDV Video	23
7	ZZERO & CCAM.....	23
8	Support for the Establishment of an Ambassador for SDVoF.....	23
9	Conclusion.....	25

List of figures

Figure 1: The countries involved in the HAL4SDV Consortium.....	7
Figure 2: HAL4SDV structure	8
Figure 3: Structure of the Transversal Activities.....	8

Figure 4: V-model-based Work Package approach..... 9

Figure 5: **Left:** Patrick Pype, NXP-NL presenting RISK-V hardware relevance for SDV; **Middle:** Andreas Eckel, TCAG presenting the HAL4SDV Project; **right:** Andreas Eckel, TCAG handing over FEDERATE flyer to participant of the NEXUS Workshop 12

Figure 6: Convergence Conference, Munich, participants 13

Figure 7: Malaga Connect Conference, Andreas Eckel, TCAG presents HAL4SDV..... 13

Figure 8: The Convergence Conference Agenda 14

Figure 9: The Spot-Light Session Agenda..... 15

Figure 10: Agenda of the E.S.B.S. Conference, Graz, Austria..... 16

Figure 11: The HAL4SDV Team at the HAL4SDV Booth at the EFECs Conference in Malta left to right: Alexander Kühhas, Edin Arnautovic (both TAAT), Eric Armengaud (Armengaud Innovate), Andreas Eckel, Amra Avdić Čaušević (TCAG) Zina Milašienė (TERA), Peter Priller (AVL-AT)..... 17

Figure 12: Harrison Kurunathan presents the poster at the HiPEAC 2026..... 18

Figure 13: Andreas Eckel (TCAG) presenting HAL4SDV at the RTR2026..... 19

Figure 14: Agenda of the SDV Ecosystem Summit 2025..... 20

Figure 15: Structure of collecting SDV Building Blocks within FEDERATE..... 23

Abbreviations

BB	Building Block
CSA	Coordination and Support Action
DG CNECT	Directorate General for Communications Networks, Content and Technology
EC	European Commission
EU	European Union
HAL	Hardware Abstraction Layer
HW	Hardware
SDV	Software Defined Vehicle
SDVoF	Software Defined Vehicle of the Future
SotA	State of the Art
SW	Software
TA	Transversal Activity
TCAG	TTTech Computertechnik AG
TRL	Technology Readiness Level
VSS	Vehicle Signal Specification
WP	Work Package

1 Summary

1.1 Introduction: HAL4SDV (<https://www.hal4sdv.eu/>)

The HAL4SDV Project is the first in a series of SDV related projects funded by the European Commission Chips-Joint Undertaking and national funding authorities of the countries the Partner organizations are resident. The project overall value amounts to €64,5 Mio, the EC investment is €17,8 Mio widely doubled by the national authorities.

The Project is coordinated by Andreas Eckel, TTTech Computertechnik AG, Vienna Austria, leading a consortium of 50 Partners and affiliated partners plus 10 Associated Partners. It consists of the leading European OEMs, Tier 1 suppliers, the major European semiconductor manufacturers, SMEs, academic Partners, and foundations representing the European automotive industry and related academia (see Figure 1).



Figure 1: The countries involved in the HAL4SDV Consortium

The HAL4SDV Project is structured in a matrix organization composed of 9 Work Packages (WP) following the classic V-Model Approach and a set of Transversal Activities (TA) that cover specific development domains according to Figure 2. The Transversal Activities are further structured by defining “Topics”, whereof the building blocks are deducted (see Figure 3).

The Work Packages are grouped in “green developments” denoting open-source, non-differentiating and non-safety-relevant developments and “golden developments” representing Intellectual Property (IP) related, differentiating and safety-relevant developments (see Figure 4).

HAL4SDV Structure

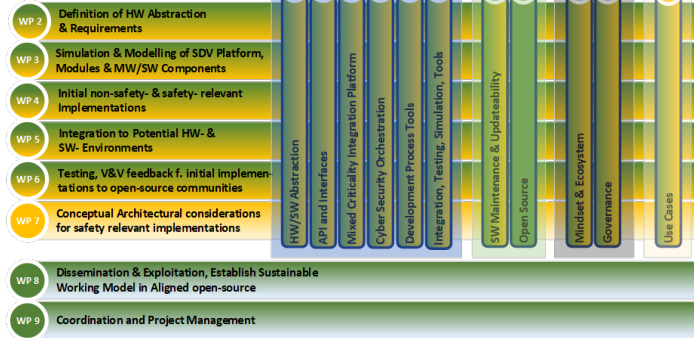


Figure 2: HAL4SDV structure

Building Block Activities					
A HW/SW Abstraction 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 complex Applications (like HMI)	B API and Interfaces B01 DSS - Vehicle Signal Specification B02 Efficiently Integrating SDV B03 Mapping for Internationalization B04 Plug & Charge according to ISO Standards available as Open Implementations	C Mixed-Criticality Integration Platform C01 On-board Integration SW Environment C02 SoA for On-board Integration SW Environment C03 Mixed-Criticality Timing and scheduling C04 Shared-Memory access for On-board Integration SW Environment C05 Virtualization Service for On-board Integration SW Environment	D Cyber Security Orchestration D01 Security Threat Analysis D02 On-board Security Service Gateway SW D03 Cloud Connectivity: Security Service Integration to On-board Integration SW Environment	E Development Process Tools E01 Linux Ecosystem for Safety E02 Memory Safe Languages for Critical Systems E03 Open tool for architecture-Modelling following a Model-based-systems-engineering Approach for Overall Vehicle Definition	F Integration, Testing & Simulation F01 Tooling for Performance F02 Tool Interoperability in Automotive SW dev. Area F03 Software Testing on Integration - Level F04 Virtualisation for Vehicle Subsystems F05 Reprocessing / Replay Simulation
Enabler Activities		Definition Activities			
G Software Maintenance & Updateability G01 Isolation of Applications G02 Sustainable Maintenance	H Open Source H02 OSS Blueprints for Compliance with EU Regulations (e.g.: cyber security)	I Mindset & Ecosystem I01 Define and Show "Automotive Grade"	J Governance J01 Process Mapping: CRA Compliance with OSS J02 Supply Chains Open-Source Governance Model		

Figure 3: Structure of the Transversal Activities

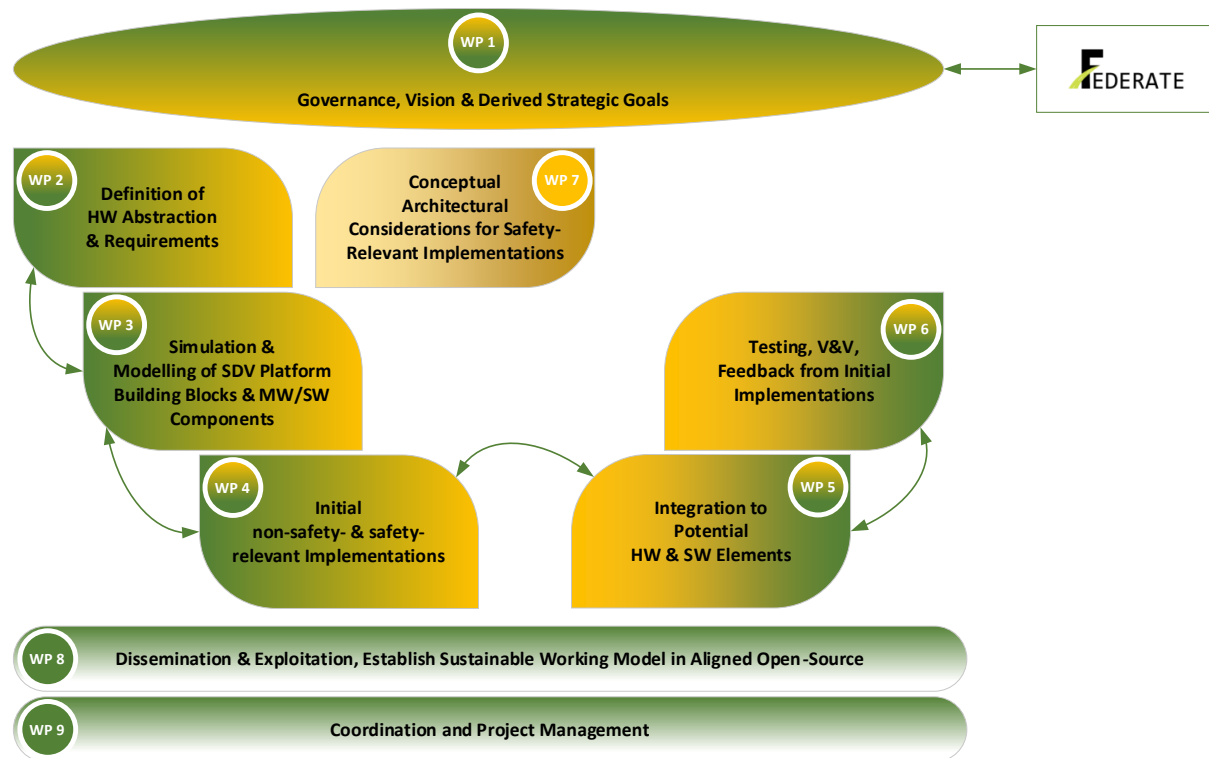


Figure 4: V-model-based Work Package approach

1.2 Executive Summary

This document summarizes the activities for cooperating with the Coordination and Support Action (CSA) Project “FEDERATE.” The work comprises the following major goals:

Firstly, the HAL4SDV shares the ambition with FEDERATE to build a sustainable Eco System for Software Defined Vehicles (SDV) for the sake of the overarching success of the HAL4SDV and FEDERATE projects but also to reach out far beyond these goals to define the basis for a European approach and to join forces on R&D work for SDV.

Secondly, HAL4SDV provides architectures and building block descriptions for the implementation of the next generation of cars equipped with SDV functionality. FEDERATE establishes a library of building blocks¹ stemming from various projects already finished or still operational. HAL4SDV has provided significant inputs to that including structural support resulting from the HAL4SDV approach.

Thirdly, HAL4SDV commits to abstain from “re-inventing the wheel” and focusses on jointly investigating, which developments and building blocks are already available and/or are in current development by different other projects. The aim is to re-use already available developments to as high a degree as possible and provide connecting software and measures to use such technologies or software components and building blocks. For this purpose, the FEDERATE Building Block library will serve as a reference.

Furthermore, both projects are significantly interested in talking to sister projects on national and EC level and to investigate how cooperation between HAL4SDV and such other projects

¹ <https://github.com/CSA-FEDERATE/Proposed-BuildingBlocks>

is possible to use the results already available and only research and develop such components that are missing. HAL4SDV has conducted several activities concerning this aspect and established measures for information-exchange in close cooperation with FEDERATE and Shift2SDV projects as well as with Partner ECLIPSE for open-source aspects.

This also comprises collecting new visions that might be developed throughout the subject industries to as a minimum allow such new concepts and ideas to be also implemented beyond the goal of HAL4SDV. HAL4SDV will be the first large scale project with a European dimension that endeavors to research and develop an SDV suitable architecture and software building blocks and components, both, in open source and IP related approach.

To support, in particular, the last point, both projects are very active in approaching other SDV related projects and subject initiatives to launch discussions and foster potential cooperation. The launch of a suitable call in the Chips-JU program and the initiation of the related proposal in reply to the call of the Chips-JU program in 2023 as well as the conduct of the HAL4SDV project was also directly supported by the EC DG CNECT organized so-called “Sherpa Governance Group Meetings”. This is a voluntary “board-like” initiative launched by Dr. Max Lemke from the DG CNECT and regularly attended by especially invited representatives of the European automotive industry to bring forward the “SDVoF”, the SDV of the Future discussion within the European automotive industry with the aim of a fruitful cooperation in the field improving the competitive situation of the European automotive industry on the market. Since late 2025, the “Sherpa Governance Group Meetings” have been followed by ECAVA, the European Connected and Autonomous Vehicle Alliance².

² <https://digital-strategy.ec.europa.eu/en/policies/vehicle-alliance>

2 The Sherpa Governance Group Meetings

The background of the Sherpa Governance Group Meetings goes back quite some time well prior to even a call was released for the SDV R&D activities. It was initiated by Dr. Max Lemke, Head of Unit Internet of Things at the Directorate General for Communications Networks, Content and Technology (DG CNECT) of the European Commission to bring together the stakeholders in the automotive industry that drive innovation for the future automotive market and composed of OEMs and Tier1s in the field. The need to become interested in SDV is found due to the paradigm shifting approach mainly stemming from China and the USA changing future vehicles and potentially also the overall business model to rely on updates of various kinds of automotive functions and later also introduce new functions on the vehicle via “Over the Air” (OtA) links engaging internet communication. Missing out on this new trend is interpreted as a massive threat even to be delayed on the capability to provide such technology and services.

The Sherpa Governance Group was launched on specialized invitation by the EC DG CNECT and served as a platform to exchange pre-competitive information among the players of the automotive industry and create an atmosphere of mutual understanding on potentially common developments to be envisaged. It also discussed how to bring it to the funded projects programs to support the expensive and risky efforts to be taken in such developments and to mitigate the risk of them. During the first meetings the success is to be seen in winning a Chip-JU call in 2023 to “host” the topic under a Special Focus-Topic and calling for a CSA project to support the field. AVL List GmbH (AVL-AT) accompanied by TTTech Computertechnik AG (TCAG) were in an essential leading position to drive the reply to the call leading to the granting of FEDERATE and HAL4SDV in the end.

Resulting from the Sherpa Governance Group Meetings, AVL-AT and FEDERATE created the kind of “brand” of “SDVoF”, the Software Defined Vehicle of the Future initiative. Its goal is to foster building and maintain an Eco System around SDV stakeholders and function as a harmonizing body to drive the work forward in a joint approach, building widely on the concepts of open source. It is intended to transfer this initial activity into the new EC Vehicle of the Future Initiative (Vehicle of the Future initiative | Shaping Europe’s digital future, <https://digital-strategy.ec.europa.eu/en/policies/vehicle-future-initiative>).

HAL4SDV is represented by multiple partners of the project within the Sherpa Governance Group and uses the advantages of receiving relevant, non-competitive information “firsthand” also from outside the HAL4SDV project and from other projects represented in both, the Sherpa Governance Group, and the FEDERATE project.

3 European Connected and Autonomous Vehicle Alliance (ECAVA)

ECAVA started in late 2025, following the footsteps of the previous “Sherpa Governance Group”, and significantly extending beyond that. ECAVA serves as industrial discussion and advisory forum, bringing together key stakeholders from across the automotive value chain, including vehicle manufacturers, suppliers, technology and tool providers, and smaller innovative tech companies and start-ups. ECAVA is structured in 4 working groups (WG), with WG1 focusing on SDV, to scale up the common open-source ecosystem, targeting rapid industrialization, and exploring collaboration on non-differentiating building blocks.

Concerning the HAL4SDV project's cooperation with ECAVA, the topic HW Abstraction is included in the application domains like autonomous driving.

Several Partners of HAL4SDV have joined ECAVA, including the Coordinator TCAG, and are thus directly involved in the next steps to structure and align collaboration, and to help grow the relevance of the European SDV eco system.

4 Joint Events with FEDERATE

The mutual interests in the SDV topic also led to numerous jointly vice versa visited events that were conducted throughout the first work period in HAL4SDV & FEDERATE.

Apart from descriptions of dissemination and exploitation documents generated in both projects, the following provides an overview on the major events conducted / visited.

4.1 FEDERATE Meetings with dedicated HAL4SDV contributions

Several joined events and activities are also described in the FEDERATE deliverable document D5.5: "Dissemination and Exploitation Activities Report" as well as the HAL4SDV D8.2: "Initial Dissemination and Exploitation Plan" and D8.8 "Dissemination and Communication Report 1".

4.1.1 HiPEAC 2025, Barcelona, 2025-01-20 to 21

Coordinating partner TCAG held a keynote presentation on "Hardware Abstraction Layer for Software Defined Vehicles (HAL4SDV)" within the conference's "STEADINESS for Complex and Critical Systems (TechNexus)" workshop in Barcelona, Spain. Andreas Eckel, Coordinator, shared information with workshop participants and Partners like NXP Semiconductors, Patrick Pype, who contributed by another presentation during the same workshop "Why RISC-V is key for the Automotive Industry" representing the hardware viewpoint. The F2F audience in the NEXUS workshop also contributed lively to the discussions. Finally, the conference offered the opportunity to distribute FEDERATE and HAL4SDV information material like Flyers and take-aways.



*Figure 5: **Left:** Patrick Pype, NXP-NL presenting RISK-V hardware relevance for SDV; **Middle:** Andreas Eckel, TCAG presenting the HAL4SDV Project; **right:** Andreas Eckel, TCAG handing over FEDERATE flyer to participant of the NEXUS Workshop*

4.1.2 Convergence Conference, Munich, Germany, 2025-02-07

The conference was chaired by Peter Priller & Michael Paulweber (AVL-Austria) and moderated by Dirk Walliser, Ambassador SDV. The focus was on how to start cooperation between the different SDV related projects and how to cross feed information and results to avoid “reinventing the wheel” (see Figure 6).



Figure 6: Convergence Conference, Munich, participants

4.1.3 Malaga Connect, Malaga, Spain, 2025-09-03&04

The Inside-Industry Association organized event, supported by FEDERATE, designated valuable exchanging experiences in the software domain part of the Chips-JU program of funded projects. Andreas Eckel, TCAG presented HAL4SDV (see Figure 7).



Figure 7: Malaga Connect Conference, Andreas Eckel, TCAG presents HAL4SDV

4.1.4 Convergence Conference, Brussels, Belgium, 2025-10-06 and 07

This Conference organized by FEDERATE and attended by different projects like HAL4SDV, Shift2SDV, ECLIPSE S-CORE, COVESA, etc. was dedicated the establishment of the SDV Eco System, fostering the exchange of information, and laying the foundation to join forces (see Figure 8).

HAL4SDV was presented by Andreas Eckel, TCAG, HAL4SDV Coordinator.

2nd SDV Convergence Conference - AGENDA

Day 1: Oct.6 th , 2025			
Charlemagne Building, Rue de la Loi 170, 1040 Bruxelles, Room Siccio Mansholt			
Time		Topic	Presenter/moderator
12:30 - 13:00	(00:30 h:min)	Registration and welcome coffee	
13:00 - 13:20	(00:20 h:min)	Tour de table, Introduction & Objectives of Meeting	Walliser
13:20 - 13:50	(00:30 h:min)	Status of actions from 1 st convergence conference (see actions from 1st convergence conference in next sheet in EXCEL File)	Bogensberger Stefan (EC) / Kappel Sören, Glasmach J. (S-CORE) / Fuchs M., Karner M. (SHIFT2SDV) / Fuchs Holk, Paulweber Michael / Arnold Johannes/Mark Fuchs/TCAG/ANDREAS S-CORE / Priller Peter
13:50 - 15:10	(01:20 h:min)	Status of BB projects and integration project(s) S-CORE BBs COVESA BBs HAL4SDV BBs SHIFT2SDV BBs AAOS S-CORE process, integration (also other BBs)	Kappel Kubovy Eckel Karner Matthes Kappel
15:10 - 15:30	(00:20 h:min)	Break	
15:30 - 16:45	(01:15 h:min)	Detail timeline and organization of integration of proposed BBs into ref.SW stack (S-CORE) Introduction Detail integration timeline (Dates, integration project milestone, BB version envisioned for integration) Additional steps required	Fuchs all
16:45 - 17:15	(00:30 h:min)	Summary and conclusion	Walliser

Day 2: Oct.7 th , 2025			
Albert Borschette Building, Rue Froissart 36, 1040 Etterbeek, Room 4D			
Time		Topic	Presenter/moderator
08:30 - 09:00	(00:30 h:min)	Welcome coffee day 2	
09:00 - 09:10	(00:10 h:min)	Recap day 1 and objectives of day 2	Walliser
09:10 - 09:20	(00:10 h:min)	ECAVA & EU Action Plan for automotive	Lemke
09:20 - 10:20	(01:00 h:min)	How to achieve goals of longterm ECAVA roadmap Introduction Workshop in small groups to define needs/tasks Summarize and prioritize collected tasks	Schleicher parallel workgroups all
10:20 - 10:35	(00:15 h:min)	Break	
10:35 - 11:15	(00:40 h:min)	Which additional integration projects exist or are envisioned? Infotainment, comfort, cockpit? Truck SW platform? Update integration timeline	Renault? Coretura, Traton all
11:15 - 11:55	(00:40 h:min)	Convergence of SDV AI assisted engineering platform (ecosystem) Introduction Discussion	Priller, Walliser all
11:55 - 12:40	(00:45 h:min)	Next steps in ECAVA collaboration organization Introduction Which workgroups are required? input to charter for ECAVA-SDV workgroup (successor of sberpa groupwork)	Lemke all all
12:40 - 13:00	(00:20 h:min)	Summary of day 2, short intro of day 2	Walliser
13:00		end of day 2 with business lunch	

Figure 8: The Convergence Conference Agenda

4.1.5 DG-CNECT Meeting Brussels, Belgium, 2025-12-15

This online event (title: Alignment on SDV between EU-funded projects and S-Core) focused on harmonization activities in the highly active community of the SDV Open Source eco system.

4.2 The Autonomous and Spotlight Session, Vienna, 2025-09-24

In the afternoon of “The Autonomous, Main Event” TCAG traditionally runs the Spot-light Session Workshop (Agenda see Figure 9), which in 2025 was conducted under the motto: “From Concept to Reality: Enabling Safe, Trustworthy, and Software-Defined Autonomous Systems with European Innovation”. As usual, the Spotlight Session was very well visited and definitely “sold-out” in F2F seats and, in addition, had a large on-line participation.

We were honored to welcome Stefan Bogensberger, DG for Communication Networks, Content and Technology, European Commission (DG CNECT, EC) and traditionally Dr. Stephane Dreher, Head of CCAM - Innovation and Deployment (ERTICO), with their presentations on the newest trends and info on the dedicated European Commission (EC) funded programs (i.e.: Chips-JU, CCAM, 2Zero and other Horizon Europe Programs).

As it has become a tradition as well, the Spot-Light Session introduced a number of related EC funded projects, but not only in the way of standard project overview and introduction, but in relation to the event’s motto. In that context, we welcomed Dr. Michael Karner, Head of Embedded Systems Group, Virtual Vehicle Research GmbH and Coordinator of the Shift2SDV

Chips-JU project (<https://shift2sdv-project.eu/>), Prof. Dr. Eng. George Dimitrakopoulos, coordinator (Ext.) at the department of research and development funding at Infineon Technologies AG presented ShapeFuture project (<https://shapefuture.eu/>), and Georg Stettinger, Senior Project Manager, Infineon Technologies AG, presenting the EdgeAITrust project (<https://www.edgeai-trust.eu/project/>). Several other projects were represented and fostered an interesting exchange of ideas and provided the “playground” for an interesting discussion.



Spotlight Session: From Concept to Reality: Enabling Safe, Trustworthy, and Software-Defined Autonomous Systems with European Innovation

18th September 2025 from 15:30 to 17 @The Autonomous event (and online)

TTTech's Spotlight Session at The Autonomous 2025, titled "From Concept to Reality: Enabling Safe, Trustworthy, and Software-Defined Autonomous Systems with European Innovation," will showcase how European collaborative projects are driving the future of autonomous mobility.

The session aims to highlight EU leadership in shaping safe and secure software-defined autonomy, bridging the gap between cutting-edge research and industrial applications. We propose a **holistic approach to safety and security**, covering functional safety, cybersecurity, and trustworthiness, crucial for scalable autonomous system deployment. The session will also underline the importance of cross-industry collaboration in building a robust autonomous ecosystem and provide actionable insights for OEMs, Tier 1 suppliers, and regulatory bodies.

This workshop will reflect on the ongoing activities to tackle these challenges together with experts, researchers, industry professionals, and policymakers.

- **Dr. Michael Karner**, Head of Embedded Systems Group, Virtual Vehicle Research GmbH, presents a common Software development framework and hardware independent microservice-oriented middleware architecture for the stepwise migration to the Software Defined Vehicle of the Future (**Shift2SDV**) covering solutions for continuous integration, validation, and over-the-air (OTA)

updates for safety-critical functions, enabling agile development while maintaining rigorous safety and security throughout the vehicle's lifecycle.

- **Prof. Dr. Eng. George Dimitrakopoulos**, coordinator (Ext.) at the department of research and development funding at Infineon Technologies AG presents **ShapeFuture project** which aims to translate advanced architectural concepts into deployable, safe, and efficient autonomous systems.
- **Georg Stettinger**, Senior Project Manager, Infineon Technologies AG, will present the **EdgeAITrust project**. This initiative integrates AI into autonomous decision-making processes, emphasizing its trustworthiness, safety, and security at the edge. The presentation will highlight solutions for the robust, explainable, and secure deployment of AI in real-time, resource-constrained environments to ensure reliable perception and actuation
- **Dr. Max Lemke (tbc)**, Head of Unit Internet of Things, DG for Communication Networks, Content and Technology, European Commission
- **Dr. Stephane Dreher**, Head of Connected, Cooperative and Automate Mobility (CCAM) European Partnership - Innovation and Deployment (ERTICO)
- **Q&A**

Join us to see how these European innovations are making safe, secure, and scalable autonomous mobility a reality.

End of document ■

Figure 9: The Spot-Light Session Agenda

The session ended with a very interesting discussion on the SDV topics, both by contributions by F2F- and on-line- participants.

4.3 E.S.B.S. Conference 2025, Graz, Austria 2025-10-09

Andreas Eckel, TCAG presented the HAL4SDV Project in the frame of the Austrian E.S.B.S. Autumn conference (<https://www.esbs-austria.eu/>) and discussed with the Austrian Chips-JU community about the new “SDV movement” in Europe. During the event the Austrian representatives of the related ministry and the Austrian funding authority “FFG” were present (see Figure 10).



Figure 10: Agenda of the E.S.B.S. Conference, Graz, Austria

4.4 EF ECS, Malta, 2025-12-03&04

The large EF ECS conference offered the unique opportunity to not only have a HAL4SDV booth (back-to-back with the FEDERATE booth), but also provide a recorded presentation to the visitors of the conference directly at the HAL4SDV booth (see Figure 11). The project was presented by Andreas Eckel, TCAG and coordinator of the project. In addition, HAL4SDV Partner TERA completed the new Project video, that was shown at the conference to the public for the first time.



*Figure 11: The HAL4SDV Team at the HAL4SDV Booth at the EFECs Conference in Malta
 left to right: Alexander Kühhas, Edin Arnautovic (both TAAT), Eric Armengaud (Armengaud Innovate), Andreas Eckel, Amra Avdić Čaušević (TCAG) Zina Milašienė (TERA), Peter Priller (AVL-AT)*

4.5 HiPEAC 2026, Krakow, 2026-01-26to28

Andreas Eckel (TCAG) held a keynote in the FORECAST Session (NEXUS Program) “A large scale R&D project and the SDV paradigm shifting movement”. The workshop found large interest among audiences with lively discussions and information exchange.

In addition, further presentations were made by Edin Arnautovic (TAAG) focussing on specific safety/security related developments and integration platforms.

Furthermore, Harrison Kurunathan (ISEP) prepared a poster for the poster session (see Figure 12).



Figure 12: Harrison Kurunathan presents the poster at the HiPEAC 2026

4.6 Brokerage Event, Brussels, 2026-02-03 to 06

HAL4SDV was prominently represented by various Partners to discuss how to share results and how to continue with new proposals to ensure high-speed progress on the SDV ecosystem. This included alignments on cooperation with other projects like FEDERATE, Shift2SDV, the new AI4SDV proposal, and many more. TCAG, TAAG, VIF, AVL, Infineon, just to name a few, were prominent representatives that frequently also cooperate and even coordinate projects in the Chips-JU program line.

4.7 RTR 2026, Brussels, 2026-02-10 to 12

Andreas Eckel, TCAG, presented HAL4SDV in the Parallel Session 31 “Software Defined Vehicles” moderated by Stefan Bogensberger, EC DG CNECT and Jean Baptiste Burtscher, Valeo. The co-presenters were Stefano Persi, MOSAICfactor, presenting 2ZERO Project TWIN-LOOP and Valentin Ivanov, TU Ilmenau presenting CODE4EV. The session had a very interesting and lively discussion with highly ranked representatives from industry and academia contributing from the side of the audience (see Figure 13).



Figure 13: Andreas Eckel (TCAG) presenting HAL4SDV at the RTR2026

4.8 FEDERATE (<https://federate-sdv.eu/>)

Since the first days of the ideas for a funding program for SDV within the initial KDT-JU now Chips-JU, AVL List GmbH and TTTech Computertechnik AG were tightly cooperating to achieve first funded projects in the field. This materialized not only in the Chips-JU program, but also in the funded programs in CCAM and 2Zero. Major parts of the work in achieving dedicated calls in the programs were borne by Dr. Michael Paulweber, MBA from AVL List GmbH and his team and Andreas Eckel, MBA, TTTech Computertechnik AG closely cooperating with the Sherpa Governance Group. The success of the initiative would not have worked without the significant activity from Dr. Max Lemke, Head of Unit Internet of Things, DG for Communication Networks, Content and Technology, European Commission (DG CNECT, EC), as already pointed out in several comments in this document. The proposals for FEDERATE and HAL4SDV as well as later the follow-on -project Shift2SDV were major milestones on the path of success and the initiation of the eco system, as it has now formed. Thus, one can state that the CSA FEDERATE was a significant and highly valuable partnership in launching the technical R&D projects resulting from the coordination work within the industry and academia involved in the resulting movement.

One of the key events for aligning activities in the SDV Ecosystem is the **annual SDV Ecosystem Summit** organized by FEDERATE. In 2025, the Summit took place in Munich (hosted by Infineon) on May 20th. Updates from HAL4SDV were presented in the SDV Project Session, see the agenda in Figure 15.

FEDERATE
European SDV Ecosystem Summit 2025
an SDV Ecosystem Forum Networking Event by FEDERATE

AGENDA

Time (CET)	20th May 2025 9:00-17:00 Infineon Technologies AG, Am Campeon 1-15, 85559 Neubiberg – Munich, Germany
09:00 – 09:30	Welcome Coffee
09:30 – 09:35	Welcome and Introduction
09:35 – 09:45	Words of Welcome by Oliver Höing, Federal Ministry of Research, Technology and Space (BMFTR)
09:45 - 10:15	Keynote: „Leading the Future of Automotive Innovation in Software-Defined Vehicles – Together“ by Thomas Schneid, Senior Director Software, Partner & Ecosystem Management, Infineon Technologies AG
10:15 - 10:45	Keynote: “Accelerate Work in Open Source Ecosystems” by Markus Rettstatt, Mercedes-Benz Tech Innovation GmbH
10:45 - 11:05	Keynote: “Collaboration Industry and Public Authorities in Digital Vehicle” by Max Lemke, DG-Connect, EC
11:05 - 11:20	Coffee Break
11:20 - 11:40	Short Introduction and Status of FEDERATE & SDVoF Initiative by Michael Paulweber, AVL List GmbH
11:40 - 12:00	Scientific Board Presentation by Daniel Watenig, Virtual Vehicle Research GmbH
12:00 - 12:10	RIGOLETTO Presentation by Knut Hufeld, Infineon Technologies AG
12:10 - 13:10	Lunch Break
13:10 - 13:15	“SDV out of the Box” by Christof Horn, Accenture
13:15 - 13:30	Interactive Slido Q&A
13:30 - 14:00	“From BB to SOP” Eclipse SDV WG Perspective by Sara Gallian, The Eclipse Foundation Eclipse S-CORE by Detlef Zerfowski, Bosch/ETAS
14:20 – 14:35	CCAM Partnership and its links to the SDVoF Initiative by Christian Merkt, BMW Group
14:35 – 14:50	“AUTOSAR in an OSS World” AUTOSAR Perspective by Michael Niklas-Höret, Continental
14:50 - 15:05	“SOAFEE in an OSS World” “SOAFEE – accelerating automotive development” by Bernhard Rill, ARM
15:05 – 15:30	Coffee Break
15:30 – 16:15	SDV Project Session HAL4SDV by Andreas Eckel, TTTech Computertechnik AG CODE4EV by Eric Armengaud, Armengaud Innovate Twin-Loop: “Open Framework for Software Defined EVs” by Stefano Persi, Mosaic Factor
16:15 - 16:35	FEDERATE BB Repository & SDVoF vision Overview on BB repository by Mario Driussi, Virtual Vehicle Research GmbH
16:35 - 16:45	Conclusion by Michael Paulweber, AVL List GmbH
17:00	Official closing of the event

The Project has been accepted for funding within the CHIP JU under Call HORIZON-KDT-JU-2023-3-CSA-IA / Grant Agreement No. 101139746.

Figure 14: Agenda of the SDV Ecosystem Summit 2025

4.8.1 SOAFEE (<https://www.soafee.io/>)

Scalable Open Architecture for Embedded Edge (SOAFEE) is an initiative on open scalable architectures for SDV and assuming mixed criticality applications. Supporting functional safety and real-time applications are key features supported in the SOAFEE approach. Thus, it is of high importance for HAL4SDV to endeavor building on SOAFEE results and avoid becoming just another activity with the same goals. As mentioned above HAL4SDV has touched base with the stakeholders in SOAFEE already within the FEDERATE Networking Event hosted by TTTech Computertechnik AG and TTTech Auto AG in Vienna in September 2024. ARM as a Governing Member of the SOAFEE initiative and an Associated Member in the HAL4SDV project, introduced the SOAFEE project. It was agreed to cooperate and investigate further steps to exchange strategies, results at least those created in open source and thus abstain from inventing SW that is not seamlessly fitting to the architecture and platform-based approaches of HAL4SDV and SOAFEE.

4.8.2 COVESA (<https://covesa.global/>)

As one of its major targets, the open and member driven non-profit organization COVESA focuses on connected vehicles and on the Vehicle Signal Specification (VSS). As such, the interest from the SDV community is again large, and a significant number of the SDV project consortium members are also COVESA Members. Again, the cooperation with FEDERATE providing a kind of a R&D project independent platform proved as an ideal approach to get in touch with the major drivers of COVESA and jointly investigate potential mutual benefit of the work conducted within the initiatives. The FEDERATE Networking Event (Ecosystem Summit, May 20th, 2025; see above) was the starting point to contact leaders in the organization.

4.8.3 Shift2SDV (<https://shift2sdv-project.eu/>)

The initial philosophy behind HAL4SDV and Project Shift2SDV was, that Research and Innovation Action (RIA) HAL4SDV project will conduct first basic work like definitions, interfaces, APIs and abstraction layer developments, as well as requirements and architectures for the goal of SDV implementation. Following projects like

Shift2SDV initially was assumed to become an RIA project, too, and would continue mainly also in the middleware domain of the on-board vehicle SW, building to a certain extent on the HAL4SDV results. However, it was then launched as an Innovation Action (IA), claiming that the TRL 4-5 developments of HAL4SDV would be refined up to a TRL 6-7. By that the project Shift2SDV had to target carry-on developments to its predecessor project to a large extent, even when it was finally assumed that HAL4SDV would look at “code first” for the HW abstraction layer and Shift2SDV would put focus on the in-vehicle middleware. However, the result is that the 2 projects that have a very similar consortium are now closely working together for a fruitful long-time cooperation. Thus, contacts were already established during proposal time. The project structure was defended in a similar way in both projects from the beginning onwards, paving the way for a smooth cooperation that in the meantime is working very well. Joint approaches and permanent harmonization of the work in operation are part of the daily business in both projects assuring that no developments are conducted for the same or similar topics in both projects. Currently a close cooperation also for UC 2 “Battery Charging” was successfully set up where the demonstrator set-up can be used in both projects. In addition, a joint approach in establishing a open-source repository and joint ECLIPSE projects for offering the results to the SDV community effectively is another success story of excellent cross project cooperation.

4.8.4 AUTOSAR (<https://www.autosar.org/>)

The Automotive Open Systems Architecture (AUTOSAR) Partnership does not require closer explanation since it is prominently known as establishing SW framework standards and open E/E Systems architecture in the industry. The aim of the SDV community is to certainly comply with these standards and therefore contacts are needed again received via the CSA FEDERATE in the Networking Event, where a presentation of AUTOSAR representatives was provided, and vice versa information about HAL4SDV and the other SDV projects was exchanged.

4.8.5 Eclipse SDV (<https://sdv.eclipse.org/>)

The ECLIPSE Foundation is a partner in the HAL4SDV Consortium and the FEDERATE Consortium. This is essential since a major part of the developments in HAL4SDV will be conducted following the Open-Source approach. With the ECLIPSE SDV open Technology Platform, HAL4SDV will directly cooperate with other ECLIPSE projects. At the first F2F HAL4SDV meeting in Vienna 25&26-09-2024, ECLIPSE Foundation introduced the opportunities of incorporating ECLIPSE Open-Source SW modules in the HAL4SDV approach and also host Open-Source HAL4SDV developments. In addition, ECLIPSE Foundation leads one of the dedicated use cases in the HAL4SDV project. Open-Source SW components can be used to quickly develop Use-Case demonstrator set-ups that can host HAL4SDV developed SW building blocks.

4.8.5.1 S-CORE (<https://eclipse-score.github.io/>)

A special case is the ECLIPSE S-CORE project (Eclipse Safe Open Vehicle Core) that targets Open-Source safety relevant vehicle central architecture-based approach for an SDV core stack, suitable for high performance computing ECUs. The stack intends to close the gap between the hardware abstraction layer and the API towards vehicle function application.

Stemming from the Sherpa Governance Group Meetings and the FEDERATE Convergence Conference, closer, technical detailed alignments followed between HAL4SDV, S-CORE and Shift2SDV.

4.8.6 Soft-D-Car (<https://sofdcar.de/language/en/>)

Various workstreams addressing the challenge of E/E Architecture for preparation for the SDV are also one of the core projects HAL4SDV is interested in and has started to extend information exchange for better alignment of developments. Representatives of HAL4SDV have visited the Soft-D-Car project in 2024.

5 Support of the FEDERATE Building Block (BB) Repository

As part of the SDVoF (Software Defined Vehicle of the Future) initiative, HAL4SDV actively utilizes and supports the FEDERATE Building Block Repository on Github (<https://github.com/CSA-FEDERATE/Proposed-BuildingBlocks>), fostering a close and continuous exchange between the two initiatives. On the one hand, HAL4SDV benefits from the structured documentation and definitions provided by FEDERATE, which offer a common language and shared understanding of essential and existing SDV - Building Blocks. On the other hand, HAL4SDV contributes by creating new building block descriptions and by referencing concrete implementations developed within the project.

Mario Driussi, Virtual Vehicle Research GmbH, introduced BB-Repository set up in HAL4SDV Jour fixe weekly meeting (See Figure 15).

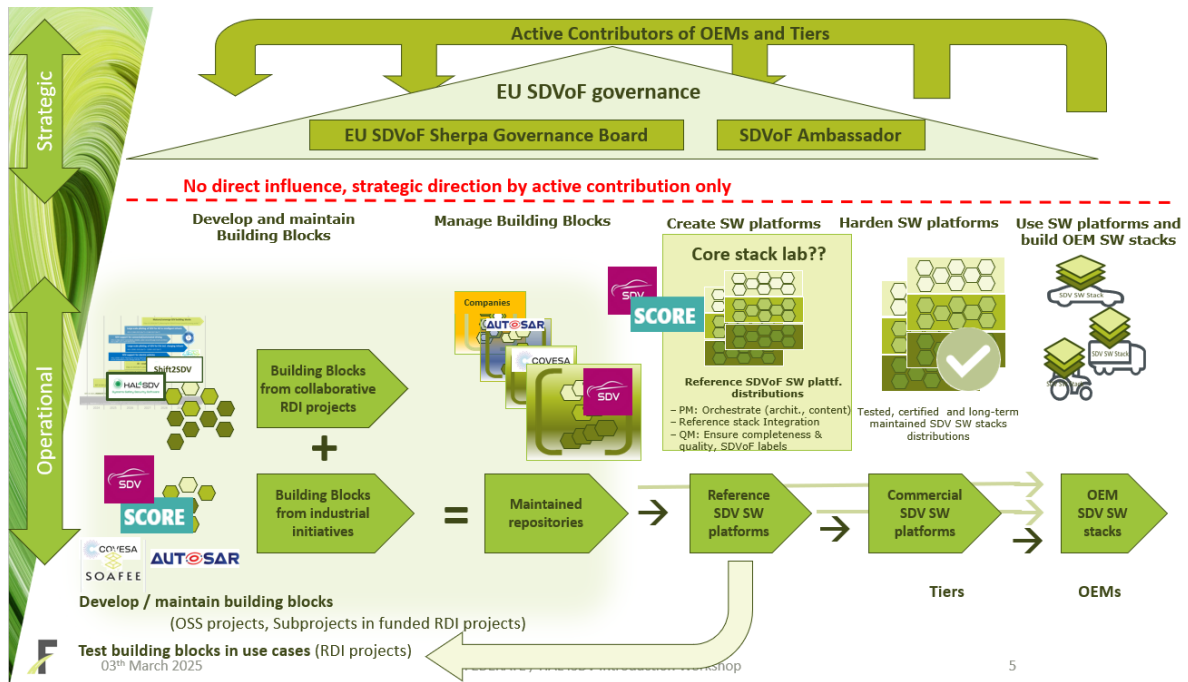


Figure 15: Structure of collecting SDV Building Blocks within FEDERATE

6 Joint FEDERATE HAL4SDV Video

FEDERATE and HAL4SDV share a video to show the European goals of the EC Chips-JU driven program and the project activities and initiatives such as the Sherpa Governance Group Meetings and the SDVoF Initiative.

The video is available on YouTube under:

<https://www.youtube.com/watch?v=4dG-NRMMyOxo&t=195s>

7 2ZERO & CCAM

The two different Programs 2Zero and CCAM have committed and launched first funded projects supporting the SDV development initiatives in close cooperation with the Chips-JU program, acting as a main-stream supporter and initiator on the European Commission side. For HAL4SDV this is a further source of expertise and opportunity to cooperate with projects like AITHENA (<https://aithena.eu/>) or CODE4EV (<https://code4ev.eu/>), where several HAL4SDV partners are also part of these smaller consortia.

8 Support for the Establishment of an Ambassador for SDVoF

Together with FEDERATE, the EC driven Sherpa Governance Group and a number of leading large-scale OEM and Tier 1 organizations identified the need of installing an “institution-like” body, upfront called and “Ambassador of SDVoF”, driving forward the urgent needs of the automotive industry in the domain of SDV. The work comprises a sound representation of the industry’s demands in the field at European Commission and European Parliament level and a “governance driven approach” potentially transferring the function to an organization in the

long-term. This will propel the building of a sustainable European Eco System for SDVoF far beyond the capabilities of individual funded R&D projects. Nevertheless, these projects would support and foster the activities to be covered by the function of an “Ambassador of SDVoF”.

Furthermore, the Ambassador of SDVoF would also facilitate the set-up of a “maintainer organization like” support taking care of the open-source topics to be “serviced” long-term ensuring that such open-source SW elements and building blocks can further be used for series production compliant to automotive standards.

Last but not least, the Ambassador of the SDVoF would also take care of facilitating pre-alignments in member states and leading automotive companies.

9 Conclusion

This document shall demonstrate the intensive efforts taken in the HAL4SDV and FEDERATE projects in connecting the different initiatives and projects together to a maximum extent possible to form a European SDVoF Eco System for supplying the car of the future with sustainable, competitive in-vehicle software solutions, platforms and architectural concepts. During the first year of HAL4SDV it is essential to get an overview of the developments and initiative on the way to be able to decide what building blocks fitting seamlessly to already existing approaches are needed to bring the SDVoF forward and closer to series production modules, components, and technologies.

The updated version D1.2, based on the initial version D1.1., shows the additional contributions and participations in further conferences participated to discuss further the initiatives and goals of the SDV community. It provided a perfect stage for spreading results and collecting further inputs to avoid developing components and building blocks that are either not needed or already available.