Showcase at IAA Mobility: Digital Loop accelerates the homologation of vehicle software updates using virtual simulation

A collaboration between Kontrol, dSPACE, FEV.io, TÜV SÜD, Microsoft Germany, T-Systems and Berylls is developing a new digital solution for the approval of updates for software-defined vehicles. The new concept for software-update approval via the mobile network, Digital Loop, will be showcased for the first time at IAA Mobility in Munich from September 4 to 8.

Munich, August 28, 2023. Before a new vehicle type with automated driving functions can be placed on the EU market, it must be tested under a variety of road and environmental conditions and validated. As software has become an integral part of vehicles, homologation – as this testing and validation process is known in the automotive industry – is now also mandatory for certain software updates. Today, it is already possible to carry out over-the-air (OTA) integration of software updates subject to homologation and even new functions into fully and partially automated vehicles. However, the processes involved are very time-consuming due to the strictness of the regulatory requirements concerned. Manufacturers, Technical Services and approval authorities therefore need a fast and reliable test procedure for approved vehicles that are already on the road.

The solution? Conformity on the basis of virtual homologation using the Digital Loop

To overcome these challenges, seven companies partnered up to form a project team with the aim of developing a software-based virtual homologation process for extensive OTA vehicle updates via the mobile communications. Their "Digital Loop" offers significant advantages for vehicle manufacturers and regulatory authorities, saving both time and cost in type approvals as well as maintenance of product conformity throughout a vehicle's life cycle. Challenges here include reducing risks and the complexity of regulatory processes, getting the increasing cost of software development and validation under control, and speeding up process time.

To overcome these difficulties, real-life scenarios are simulated using cutting-edge techniques ensuring that the digital environment offers the accuracy and reliability required for testing, validation and homologation. The virtual simulation environment is a digital image of the real world, based on highly detailed, realistic 3D models of streets, vehicles, pedestrians, weather conditions and other factors. The vehicle systems are confronted with these simulations and their reactions and decisions are analyzed. Digital Loop is designed to significantly accelerate the homologation process for OTA software updates and to substantially reduce the number of analogous test processes.

Kontrol, dSPACE, FEV.io, TÜV SÜD, Microsoft, T-Systems and Berylls united in a single mission

With "Digital Loop", the project team is striving for faster, continuous and virtual homologation: "Our mission is to revolutionize the validation and homologation of software updates in software-defined vehicles and shorten the time to market, while ensuring the highest safety standards and compliance with legal requirements in operation", explains Alexander Kraus, TÜV SÜD CTO Division Mobility.

Modern cars are computers on wheels, with software controlling their key functions. Given this, cross-industry collaboration between car manufacturers, authorities and Technical Services as well as IT and software companies is taking on an increasingly important status. Digital Loop is a broadly diversified project team that combines all relevant areas of expertise: **TÜV SÜD** operates as a Technical Service on behalf of authorities and can thus draw on comprehensive expertise in safety assessments, certification and homologation. **Kontrol** supplies knowledge in the field of regulatory compliance in formats including a software-driven compliance platform. **FEV.io**, an integrated provider of software development services for intelligent and safe mobility, provides worldwide support along the entire value chain of vehicle and system development. **dSPACE** contributes its expertise in the simulation and validation of autonomous driving functions. **Microsoft Germany** offers the cloud infrastructure of Microsoft Azure as well as various AI, VR and cybersecurity technologies and its extensive competences. **T-Systems** integrates the building blocks provided by the project partners into a holistic solution and transmits the OTA software updates to the vehicles over the mobile network. **Berylls Group** delivers Project Management Office, Partner integration & Organization.

Digital Loop: Showcase and panel discussion at IAA Mobility 2023

The team is presenting its concept to the public for the first time at IAA Mobility in Munich. A showcase at the trade fair centre maps the entire virtual homologation process, from the pre-update functionality (test run 1) and a step-by-step presentation of the virtual homologation to the post-update enhanced functionality (test run 2). An operational design domain (ODD) expansion for an SAE level 3 vehicle provided by FEV.io with automated lane-keeping system – an update that is critical for homologation – demonstrates the interaction between the individual partners in practice.

A panel discussion entitled "The Future of Vehicle Homologation: Embracing Innovation and Technological Advancements" will be held at 4 pm on 6 September. Top executives from the vehicle industry will discuss the challenges, technological solutions, and future scenarios of homologation. Richard Damm (President of Kraftfahrt-Bundesamt (KBA)), Kai Grünitz (Board Member Technical Development at Volkswagen Brand), Patrick Fruth (CEO TÜV SÜD, Division Mobility), Dr. Rupert Stützle (General Manager Lead EMEA for Manufacturing and Mobility at Microsoft) and Dr. Christian Hort (Senior Vice President Automotive, T-Systems International) have confirmed their participation in the panel discussion to be held on the Blue Stage in Hall A3.

If you are interested in an interview with one of the project partners or wish to experience the Digital Loop in action, please make an appointment at media@digi-loop.com.

About TÜV SÜD: Founded in 1866, the TÜV SÜD Group has evolved into a global enterprise. More than 26,000 employees worldwide are contributing significantly to making technical innovations such as Industry 4.0 or autonomous driving safe and reliable. www.tuvsud.com

About Kontrol: Deep-tech SaaS company Kontrol digitises and translates applicable road-traffic legislation, standards and norms into machine-readable code, enabling their implementation in vehicle systems and subsequent validation. www.kontrol.tech

About FEV.io: FEV.io is one of the world's leading providers of software development services for intelligent mobility solutions in the domains of systems engineering, functional safety and cyber security, connected mobility, ADAS/AD, infotainment, SW and EE platforms and SW and EE integration. www.fev.io

About dSPACE: dSPACE is one of the world's leading providers of simulation and validation solutions used in the development of connected, autonomous and electric vehicles. www.dspace.com

About T-Systems: Represented in more than 20 countries, with 27,000-plus employees (as at 31 December 2022) generating annual revenue approximating 4 billion euros (2022), T-Systems is one of Europe's leading providers of IT services and digitalisation solutions. www.t-systems.com

About Berylls Group: The Berylls Group focuses on all topics of the future that are essential for successful, viable and digital performance in the automobility ecosystem. The expertise of its top management advisors extends across the entire automobility value chain – from strategic concepts to improvement of operating performance. www.berylls.com