

# Quantified Cars: Digital services and business implications based on vehicle data

Dr. Alexander Stocker and DI Christian Kaiser (Virtual Vehicle Research Center)

Dr. Eric Armengaud and DI Peter Priller (AVL List GmbH)

A modern vehicle is a ‘computer on four wheels’ equipped with many different types of sensors. The continuous collection of vehicle data facilitates the generation of innovative digital services for drivers and other stakeholders. In recent years, the ongoing digitalization of the automotive industry has emerged a number of new players. In analogy to the Quantified-Self-movement, the IT industry in the USA has evolved a number of Quantified Car<sup>1</sup> startups, which are backed by enormous amounts of risk capital, reaching far more than 20 million USD in some cases. These developments demonstrate that investors perceive a high market value of digital services based on vehicle data.

The proposed talk dives into one important aspect of digitalization, the Quantified-Car-phenomenon, and analyses the most prominent Quantified-Car startups, Automatic, Mojo, Vinly, Zendrive, and Dash. The potentials and challenges of data-driven digital services are further explained by showcasing a demonstrator developed at Virtual Vehicle Research Center (an “IoT-enabled car2cloud data logger”), which has been applied in a series of ongoing European Research projects including SCOTT<sup>2</sup> and AEGIS<sup>3</sup>. Outlining the impact of quantified cars for business stakeholders, this talk continues with a short discussion on the increasing competition between players from the ICT and the automotive domain on the supremacy in the development of a digital vehicle services.

Linking to the challenge of vehicle development and production, this talk introduces another impact of digitalization in the automotive industry: The shift from traditional business models (e.g. vehicle as a product) to new, data-driven business models (e.g. transportation as a service, digital services based on vehicle operation data) is a strong driver for innovation and automotive market re-organization. Hence, this talk will further enhance the known concept of industry 4.0 as “digitalization over the entire product lifecycle”, and highlight opportunities of data and information to build the bridge between technologies, application domains, and product lifecycle.<sup>4</sup>



Figure 1: Showcasing three different GUIs of Smartphone Apps developed by quantified car startups

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<sup>1</sup> Source: Alexander Stocker, Christian Kaiser, Michael Fellmann (2017): Quantified Vehicles - Novel Services for Vehicle Lifecycle Data, Business & Information Systems Engineering, April 2017, Volume 59, Issue 2.

<sup>2</sup> SCOTT – Secure Connected Trustable Things: <https://scottproject.eu>

<sup>3</sup> AEGIS - Advanced Big Data Value Chain for Public Safety and Personal Security: <http://www.aegis-bigdata.eu>

<sup>4</sup> Source: Eric Armengaud, Christoph Sams, Georg von Falck, Georg List, Christian Kreiner, and Andreas Riel: Industry 4.0 as Digitalization over the Entire Product Lifecycle: Opportunities in the Automotive Domain, EuroSPI 2017: Systems, Software and Services Process Improvement pp 334-351.

**Dr. Alexander Stocker** holds a doctoral degree in business administration from Karl-Franzens-University Graz (2010) with a focus on information systems. He is a key researcher in the area Information & Process Management at the Virtual Vehicle Research Center in Graz, Austria. Before he was a key researcher at the Institute Digital of Joanneum Research (2008-2013), an executive assistant to the CEO at the Know-Center, Austria's Competence Center for Knowledge Management (2004-2009), and a business consultant for information management and technology at Datev (2002-2004).

**DI Christian Kaiser** has obtained his master degree in Software Development and Business Management from Graz University of Technology and holds the position of a senior researcher at Virtual Vehicle Research Center in Graz, Austria. He is a specialist in Enterprise Data Web-Visualizations based on Semantic Technologies and has participated in many national and international industry-driven research projects including CRYSTAL, where he has developed interoperability solutions for tool integration through the use of Open Services for Lifecycle Collaboration (OSLC).

**Dr. Eric Armengaud** received his M.Sc. from ESIEE Paris, in 2002, the PhD. degree from the TU Vienna, in 2008 and the MBA degree from IBSA, in 2016. He has more than 15 years of experience in automotive embedded systems in different positions. He is currently project manager R&D with the responsibility to identify, set-up and manage national and European R&D programs within the AVL PTE business unit. Eric Armengaud is author and co-author of more than 70 peer reviewed publications and patents, and is guest lecturer at the University of Applied Sciences FH Joanneum.

**Peter Priller (DI)** is technology scout for embedded systems in AVL ITS Global Research & Technology. After graduating in electrical engineering at technical university Graz, Austria, he worked for some two years in ASIC development at an RFID startup. Since then he is with AVL Graz in various positions from software development to system architecture / real-time systems to software project management. Since 2011 he works in AVL ITS global R&T responsible for managing research cooperations and projects focusing on embedded systems and wired/wireless communication networks. Mr. Priller is involved in national and European research projects and holds several patents in the field of real time control and measurement systems. He lectures at the university of applied science (FH) computer network engineering, as well as the technical university Graz on automotive test systems.