EBOOK

2023 Automotive Product Development Predictions

Automotive experts discuss challenges, innovations, evolving regulations, and tips for success in the industry

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1 Introduction

Introduction

In recent years, unprecedented challenges and changes have ushered in evolving innovations and process changes for teams across industries. For those in the automotive industry, these changing conditions will present a new landscape and introduce unique challenges, opportunities, and more than likely, many surprises.

As we were entering 2023, Jama Software® asked selected thought leaders — across various industries — for the trends and events they foresee unfolding over the next year and beyond.

In this eBook, we asked **Steve Neemeh**, CEO / CTO of LHP Engineering Solutions – **Danny Beerens**, Senior Consultant at Jama Software – and **Richard Watson**, Practice Director at Jama Software – to weigh in on automotive product and systems development trends they're anticipating in 2023.

Meet the Experts

STEVE NEEMEH
CEO / CTO,
LHP Engineering Solutions

DANNY BEERENS
Senior Consultant,
Jama Software

RICHARD WATSON
Practice Director,
Jama Software

2 Biggest Design Trends in the Automotive Industry and How They Impact Development

Biggest Design Trends in the Automotive Industry and How They Impact Development

Neemeh: A generation ago software was introduced in engine controls that changed the automotive industry and allowed for efficiency and emissions improvement that mechanical systems could not provide. In today's world, software is entering a new stratosphere of complexity. Rather than focusing on emissions, the goal is the user experience. High-tech meeting transportation changes the paradigm for automotive companies.

Beerens: I don't see a lot has changed in this regard. What is changing is what's being built, not how it is being built.

Watson: Taking advantage of Live Traceability™ will become increasingly important.

Definition of Live Traceability

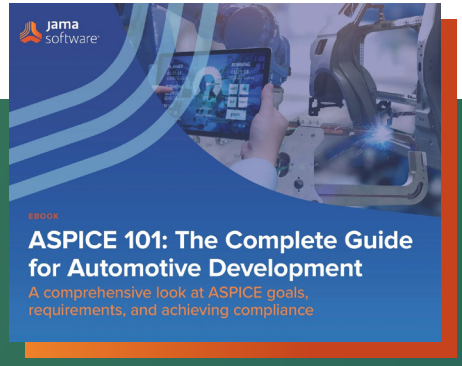
The ability for any engineer at any time to see the most up to date and complete up and downstream information for any requirement, no matter what stage of development it is in or how many siloed tools and teams it spans. This enables the engineering process to be managed through data, and its performance improved in real time.

To learn more, click here »

3 Biggest Challenges in Automotive Development

Biggest Challenges in Automotive Development

Neemeh: The commercialization of the zero-emissions vehicle is the biggest challenge for 2023. The price points are a challenge. The supply chains are limited and not optimized for worldwide expansion. And, the energy grids are outdated in many places, such as California.



ASPICE 101: The Complete Guide for Automotive Development

In this complex world of modern automotive development, many companies are adopting the Automotive SPICE (also known as ASPICE) standard for software development to meet these new challenges.

Download our Automotive SPICE guide for a comprehensive look at ASPICE goals, requirements, and levels in automotive development.

In this guide, we'll explore:

- ASPICE vs. ISO 26262
- How ASPICE affects automotive development
- How to ensure compliance

Get the guide »

4 The Next Decade: What Will Change and What Will Remain the Same

The Next Decade: What Will Change and What Will Remain the Same

Beerens: More and more brands will move to electric vehicles, making those vehicles and specifically their motor management components more software driven. The various other components (primary functions, driver assistance/automation, as well as onboard entertainment) will also become more electronically controlled and thus software driven.

Clearly the Automotive Industry is shifting from Hardware/Mechanical Engineering and Electo-Mechanical to Software Engineering, forcing Product Data Management, or Product Lifecycle Management, vendors to start including Application Lifecycle Management into their environments. Hence you see Siemens Teamcenter has acquired Polarion and PTC Windchill acquired Codebeamer recently.

The Holy Grail will be an ALM/PLM environment that truly embraces Configuration Management for all engineering disciplines involved, combined.

Anticipating a new player not hindered by their already existing PLM or ALM application, neither their customer base, to develop a truly all incorporating 'Engineering Assets Configuration Management' environment, platform or application.

For the next decade, next to fully autonomous driving vehicles, flying cars might be the new way to fight congestion and a more personalized way to get around.

> Autonomous driving vehicles even sparked new fields in Software Engineering, like Ethical Software Engineering (studies the interactions of human values and technical decisions involving computing).

Neemeh: The adoption of EVs will continue. Governments are behind it and the adoption rate is increasing.

Changing Regulatory Guidelines

Neemeh: With any new products in automotive, recalls will drive governments to regulate safety more closely. Functional safety is now a common term in automotive and most large OEMs are trying to find a way to comply and keep themselves from facing potential liability. The implementation of functional safety in the software development process will keep inching forward until a trigger makes it mandatory.

Involvement in the design process and review of ADAS features will become more important. The NHTSA has already started putting frameworks in place for that in the USA. In Europe, functional safety is commonplace and regulated already.

Over the next five to ten years, things will continue to move as fast as ADAS features move forward. Any autonomous Level 5 applications will jump-start this trend.

Beerens: Certainly, autonomous driving will introduce regulations to control not only Functional Safety and cybersecurity, but also for road safety (and legal responsibility) to interact with non-autonomous driven cars, until we've reached an era where none of us drive ourselves and all cars are controlled centrally to manage traffic flows.

Demands on alternative powertrains (e.g., hydrogen, or fuel cells) and existing electric driven cars' necessity for fast charging and/or quick exchange of batteries, will spark off new technologies.

Apart from the obvious increase in data points and data exchange of the vehicle itself (sharing information for predictive maintenance, or usage of the car; tachograph in trucks) and its manufacturer and/or service station, G5 Connectivity of (autonomous driving) vehicles interacting with new traffic control instruments in, next to, or on the road that assist with difficult traffic situations (automatically move to the side to allow emergency vehicles to pass), or location (purposely slow down at intersections that don't have clear visibility of oncoming traffic) and react to traffic lights.

As a reaction to reduce CO2 emissions (cars sales are in a slow decline for a few years now already) new forms of mobility will arise where MaaS (Mobility as a Service) are being offered, sparking off disruptive newcomers to the traditional car sharing companies (renting: Hertz, and even taxi: Uber), like for example Lynk&Co, offering "memberships" for more flexible car usage and for car sharing with family and friends.

Leveraging Innovative Tools for Success

Neemeh: Functional safety requires a strict development process and tools that support that process. Traditional tools only meet a small piece of that. They need to be integrated into an overall workflow and safety culture.

Major Industry Disruptions

Watson: Political environment, supply chain issues, increased cost of specific items (such as chips). This increased cost is pushing the buyers into higher income areas, changing what kinds of cars will be successfully built.

Because of cost issues, refurbishing and retrofitting existing cars will become increasingly important. Similarly, car sharing will be increasingly wanted to control costs.

Cybersecurity in Automotive Development

Neemeh: Safety can't be achieved without cybersecurity. Assessment of your system's vulnerability and its inclusion in your safety case is key to overall product acceptance. The more that cars become connected, the more this becomes important. Autonomous driving will be the pinnacle of connected cars. The more we move in that direction the more cybersecurity becomes a concern.

Watson: A shift towards Internet of Things (Iot) has exposed almost all aspects of automotive systems to the internet and social media. Cybersecurity will take a stronger focus, especially for those software systems that already interact with our social networking applications.

Beerens: Not only for our social networking applications; for long all systems utilizing the various onboard connections simply accepted instructions, without checking if that instruction was from a valid source. The infamous hack of a Landrover during Black Hack 2014 proved that. Encryption and intrusion detection are a good line of defense, but Zero-trust (or validating the source of the commands) Cybersecurity will be increasingly important for onboard systems from entertainment systems, connections like CAN, wifi, bluetooth or NFC, to motor management.

Necessary Process Adjustments

Watson: Automotive systems continue to have a stronger focus on software and this shift will continue. Different categories of software are provided in a vehicle from safety critical to entertainment and this drives complexity sky-high.

With regulations continuing to get more stringent, development practices for non-safety-critical software systems must be tightened and this drives a focus to improve Agile practices. “Agile” is not an excuse to “throw something together” and must be supported by improved specification and verification techniques.

5 The Differences Between Companies Who Will Survive, and Those Who Won't

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Neemeh: Getting prototypes on the road and small-scale production with new technology (EV/Autonomous) is a monumental feat. The next step, however, is the commercialization of that technology into a transportation industry that is concerned about public safety. Those that consider that in the rollout and enable the scaling of safety-critical infrastructure will win, while the others will hit a brick wall of regulation.

Watson: A combination of sustainability with control of spiraling costs. There is a world shift in planetary awareness and the automotive market is at the forefront of reducing our consumption of fossil fuels. Car prices are increasing beyond inflationary rates and this increase will price out much of the lower market. Only organizations that can shuffle sustainability, quality, and costs will survive this decade.

6 Advice for New Automotive Companies

Advice for New Automotive Companies

Neemeh: Get your workflows set up and your tools ready and optimized before you start throwing bodies at problems. Engineers are expensive. When they are set up properly, they can create miracles. But if they are burdened with administrative problems, they will get frustrated and leave.

Beerens: Look at established tool chains and industry templates to have a running start at the get-go. The European Union has an advisory board with such tool chains and templates. Concern yourself with compliancy from the beginning. Which compliancy standards you concern yourself with will depend on what parts of the auto you are working on.

Watson: Don't try and define and invent the wheel — get help. There are many development tools available, find which tools work best based on tool reviews. Once selected, ask the vendor for the best way of working and don't force the tool to do inefficient practices.

7 Topics That Need More Attention

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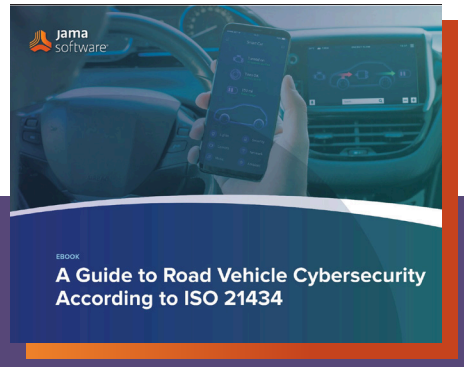
Watson: Understanding how to address complex problems without the systematic nature we have relied upon. This is the only way to keep control of costs.



As the automotive industry becomes more complex and more connected, and as mentioned in this paper, cybersecurity is emerging as a major concern, and therefore a priority for development teams.

One standard, in particular, has been developed to address cybersecurity risks in the design and development of car electronics — ISO SAE 21434 “Road vehicles — Cybersecurity Engineering.”

In this comprehensive guide, we cover:

- An overview of ISO SAE 21434
- The urgency behind automotive cybersecurity
- How Jama Connect supports cybersecurity engineering

Get the guide »

8 How Jama Software Can Help

How Jama Software Can Help

Watson: Jama Software is perfectly positioned to help the automotive industry allowing extended stakeholders to be directly involved with authoring and reviewing specification and verification activities rather than relying on tool super-users and PDF reports.

Beerens: Jama Connect® is a perfect fit for Product Design and collaboration with all its Stakeholders to refine, expand and improve Product Design, before any of these (proposed) changes are even visible in a PLM environment thereby preventing disruptions in Production before consensus has been reached.

Accelerate Development and Simplify Compliance with Automotive Software Aligned to Automotive Manufacturing Industry Standards and Regulations

Product development in the automobile industry demands automotive software designed for compliance. Jama Connect for Automotive is built to include key frameworks that support safety-critical standards and regulations in automotive product development, is ISO 26262 certified, and capable of meeting complex requirements management needs.

> To learn more about what is included in Jama Connect's Automotive solution, see our Jama Connect® for Automotive Solution Overview

"We're looking to bring our partners and customers directly into Jama Connect so we can collaborate with them in real time. Instead of sending around Word documents and having long email chains, this will make everything more effective and efficient and will allow us to have traceability right from the get-go."

JANA F. VP TECHNOLOGY, AMP

About the Authors

STEVE NEEMEH

Steve Neemeh joined LHP in 2015 to lead the expansion of the west coast operations. He is the leader of the strategy and solutions architects as well as president of the delivery consulting organization. Steve has over 25 years of Functional Safety experience prior to joining LHP. Steve has launched multiple start-up operations and has taken them to full production. Notably, a complete ground up electronics and software development group to service commercial aerospace electronics and military vehicle power electronics. For LHP, Steve pioneered the implementation of safety critical applications in California, launching functional safety for autonomous driving applications as well as air mobility.

DANNY BEERENS

Danny Beerens has 15 years of experience implementing, training, maintaining and supporting Application Lifecyle Management processes and their environments.

Danny started in Software Configuration and Change & Defect Management (i.e., Workflows.) After joining Telelogic, he moved into Requirements and Test Management over the last decade, in roles as Support Engineer, Process Engineer, Consultant, and System Architect.

Throughout his career Danny's worked on projects and collaborated with customers in the Medical Devices, Aerospace & Defense, Automotive, and Semi-conductor industries.

"The need to integrate ALM and PLM (and even beyond!) is apparent across all industries."

RICHARD WATSON

Richard Watson is the Practice Director for horizontal solutions, engaged in identifying and creating services and assets spanning the Jama Software vertical solutions. Richard has a client first attitude and is passionate about Requirements and Systems Engineering. Based in the UK, Richard has been working in the systems and software industry for nearly 35 years and has been directly involved in most aspects of Systems Engineering from testing flight systems, through to software development of modeling tools, and Product management of IBM DOORS. Richard joined Jama Software as Practice Director in 2021

Jama Software® is focused on maximizing innovation success in multidisciplinary engineering organizations. Numerous firsts for humanity in fields such as fuel cells, electrification, space, software-defined vehicles, surgical robotics, and more all rely on Jama Connect® requirements management software to minimize the risk of defects, rework, cost overruns, and recalls. Using Jama Connect, engineering organizations can now intelligently manage the development process by leveraging Live Traceability™ across best-of-breed tools to measurably improve outcomes. Our rapidly growing customer base spans the automotive, medical device, life sciences, semiconductor, aerospace & defense, industrial manufacturing, consumer electronics, financial services, and insurance industries. To learn more, visit us at: jamasoftware.com.