THYSSENKRUPP PRESTA STEERS THE FUTURE WITH SYSTEM LIFECYCLE MANAGEMENT

By Mario Leber

The full steering system supplier of thyssenkrupp, thyssenkrupp Presta AG, has embarked on an ambitious System Lifecycle Management project to shape its future engineering processes and IT landscape to enable Model Based Systems Engineering (MBSE). The first step towards SLM is to implement a new PLM solution. PROSTEP steers the SLM team through the technical specification and system evaluation process.

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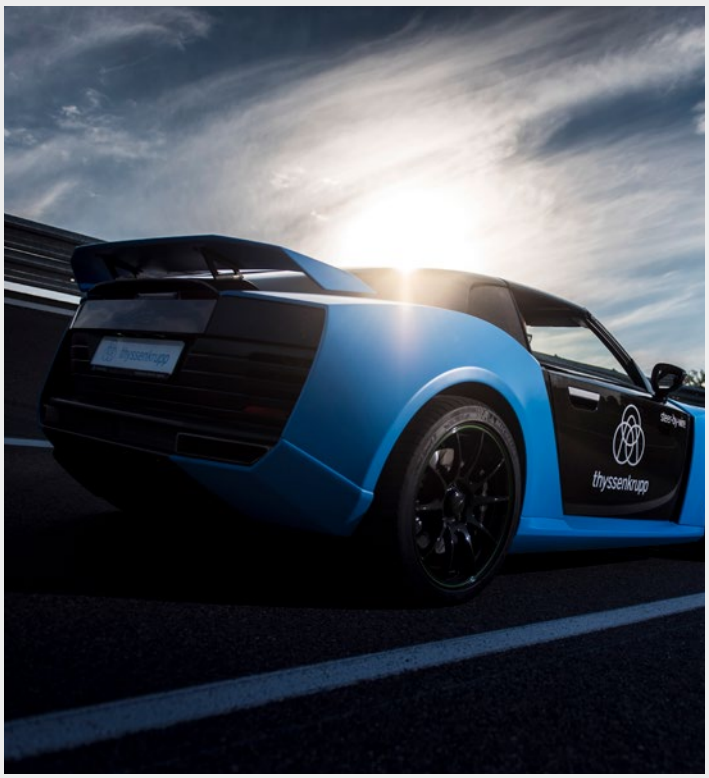
thyssenkrupp Presta AG in Eschen is the lead company of the thyssenkrupp Steering division which is part of the automotive business of thyssenkrupp. The automotive supplier is among the world's largest manufacturers of steering systems and a technology leader in the field of cold forging. Every fourth car in the world runs with a thyssenkrupp steering system. Headquartered in Eschen, Liechtenstein, the company has 17 sites- four technology centers (two incl. manufacturing) and 15 manufacturing plants with approximately 9000 employees worldwide. Whereas mechanical design is mainly done in Liechtenstein, the development site in Budapest, Hungary, is the competence center for E/E hardware (Electrics/Electronics) and software development.

Many of the challenges thyssenkrupp is facing are due to the actual trends in the automotive industry like autonomous driving, e-mobility and car-to-car connectivity, but also due to stricter safety and environmental requirements. Steering can do a lot to reduce Co2 emissions. Customers need new steering technology for autonomous vehicles and want the steering feel to be customizable. They foster cross-platform developments to reduce costs which on the downside require a higher degree of modularity and standardization of the steering systems. Consequently, the company has evolved over time from a component manufacturer to a supplier of complex mechatronic and cybertronic systems which today employs more hard- and software engineers than mechanical designers.

PLM AS THE CORNERSTONE FOR SLM

New steering functions are mostly driven by E/E and software which makes products and product development a lot more complex. With product complexity increasing the need for integrated processes and a digital thread becomes crucial, as Dr. András Balogh, Chief Technology Officer E/E Competence Center in Hungary points out. "We can't design tomorrow's products with yesterday's engineering methods and technology. In the future, the target development process will be much closer to Model Based Systems Engineering and the mechatronic V-model-based approach. This is the long-term goal which we address with SLM."

Defining the SLM strategy and roadmap was a longer process, because the project team first had to develop a common understanding of where they wanted to go and what they needed for their journey to digitized engineering. A good deal of PROSTEP's consulting work consisted in moderating the team's alignment process and in elaborating a system neutral SLM concept as prerequisite for the PLM selection process. „The most important contribution of PROSTEP was to help us understand what we needed and, secondly, to provide a vendor-neutral opinion of what the solutions on the market are capable to deliver", says Wolfgang Xander, who is responsible for semi-central development and business process.



Replacement of the existing Agile e6 PLM installation is a major necessity as the software is quite outdated and thyssenkrupp Presta does not see improvements anymore. The idea is not to have a single-vendor solution, but to implement a modular architecture. „We need a stable PLM platform as core of SLM to be able to build a backbone that should integrate all other subsystems used in engineering and that provides an information access to connected, clear and consistent data," explains Klaus Brandner, SLM Project Manager

The IT infrastructure of the company is quite heterogeneous and far from being integrated. It consists of different CAD systems for mechanical design, Altium for E/E development with only a rudimentary integration into Agile e6 PLM and various tools for software development which are linked to a homegrown Application Lifecycle Management (ALM) environment. The company has made a great effort to integrate the tool chain to comply with ASPICE and other standards that require traceability from requirements classification to test and validation. "Nevertheless, software development is still separated from the PLM world", as András Balogh and Patrick Schäfer, IT Architect Engineering IT explain.

STARTING WITH A PROOF OF CONCEPT

With the help of PROSTEP the project team elaborated a long list of requirements to select a short list of PLM vendors with whom the company will start a proof of concept early next year. „We have defined test cases along the whole product lifecycle, starting with Requirements Engineering up to Functional Modeling and regarding the Bill of Material (BOM), a Multi-BOM Management," explains Brandner. At present the company is handling just one (Manufacturing) BOM in the PLM system, "which means a tremendous effort for the engineers as every change in the supply chain, in logistics or in manufacturing falls back on them", says Xander.

After the proof of concept, thyssenkrupp Presta will do a longer pilot phase using the old and new PLM systems in parallel. The idea is to migrate functional areas like Requirements Engineering or Master Data Management (MDM) to the new environment and roll it out globally to all domains involved in the process. “A migration by projects or sites would cause to much disruption in the organization as there are many legacy data being reused in new projects,” explains Brandner.

A common Requirements Engineering from the system level down to the domain-specific requirements will be one of the key functions of the new PLM solution and an important enabler of MBSE. Customer requirements are generally managed in DOORS, but – except for hardware and software – there is no traceability to design an implementation. For software the company uses a proprietary AutoSAR tool integrated with requirements management and test specification, as Balogh says: “Ideally, we would like to use the same environment for the management of customer requirements, internal system requirements and software- and hardware requirements to ensure cohesive traceability over the whole process down the (left side) of the V-model.”

“The biggest challenge on the technical side will be the integration of the different tools into the new Presta System Lifecycle Management Backbone”, as Brandner continues. thyssenkrupp Presta will probably have to replace some of the existing tools that might not be designed for easy integration. Even bigger will be the challenge to adapt the organization to the new ways of cross-domain collaboration and communication which might require changes in responsibility and new roles. “It does not make sense to work in the new environment with an organization which is 30 or more years old;” concludes Balogh.

* SysLM or SLM in thyssenkrupp Steering specific wording.

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