Interview with Dr. Jochen Schaffnit
Adam Opel AG

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Mr. Schaffnit, we would like to talk to you about the model management in virtual prototyping. The importance of virtual testing is constantly growing, especially in the development of active safety systems. The development process is therefore also facing ever greater challenges. But let us start with a personal question: How would you describe your passion for driving?

I have a great passion for driving, especially when I can really drive. However, this only lasts as long as I am not caught in slow-moving traffic or traffic jams. The situation must be just right for me to be able to really take pleasure in the enjoyment of driving and the functions that my car offers.

Talking about vehicle functions: What do you think about advanced driver assistance systems and the vision of highly automated driving?

Highly automated driving is absolutely fascinating and advanced driver assistance systems at its core are a fantastic technical innovation. As an engineer, I am very enthusiastic about these innovations. When I get caught in stop-and-go traffic or traffic jams, I could imagine automated driving to be especially useful, as I could already be productive on my way to the office. But I would not want to do without the possibility of driving freely when I want to. I absolutely welcome assistance systems since they make many driving tasks easier. In addition, it is my job to develop new functions and that is something I really enjoy doing.

Could you give us some details about the development of advanced driver assistance systems at Opel? Do you focus on optimizing the existing systems or are the departments primarily concerned with developing new functions?

Both. Especially in the field of safety systems, we are concerned with continuous and intense further development. The Euro NCAP requirements for existing systems are growing on a regular basis and new tests are introduced – while scenarios are getting more and more complex. Of course, Car2X communication is also part of our research and development. For instance, Opel alongside many other partners are part of the project „simTD" (Safe and Intelligent Mobility – Test Field Germany) in the area of V2V.

Your development process includes virtual test driving with CarMaker. What are the benefits of virtual testing and which challenges are connected to this?

Nowadays, we can no longer imagine developing vehicles without using simulation tools. At Opel, virtual test driving is an essential part of the process and will only gain in importance in the future. Especially the complex test cases for advanced driver assistance systems and safety systems can no longer be managed with in-vehicle tests only, which is why the focus is shifting more and more onto virtual test driving. A larger part of the development is moved to the virtual world in other departments as well. However, this also means that virtual test driving needs to be used efficiently. Therefore each user needs to have access to the same validated models during the entire development cycle. More and more colleagues are including virtual tests into their processes – this means that a wide range of models can be developed and tested at the same time. Each and every one of them having access to the most recent, validated state of models, test runs, vehicle data sets, etc. at all times is one major aspect.

One model, many users: How do you solve this issue at Opel?

We have developed an approach called "Master Model". The key aspect is a model framework, which is a template that all users can use to build and develop a model, individually and for their particular development priority. Existing libraries with validated models can be accessed by all users. This approach facilitates the workflow immensely as it ensures that parallel work is avoided and that we can rely on the functionality of these models. In addition to the access to different models, other related files such as existing test runs can be reused. The advantage is that scenarios do not have to be recreated manually and that the same tests can be reused during the entire development process. All of these files are stored in a database, which is the "gold source" and takes care of the version control and configuration management.

Developing a model also involves the accumulation of an enormous amount of data. What is your solution for the cooperation between the different departments? Are there standards or rules?

Considering the large number of users, some rules are definitely sensible. To be exact, we have guidelines for acronyms and abbreviations, the model structure as well as the color of blocks or naming conventions for signals, parameters and files. This may sound like additional work, which is basically true, but it pays off in the long run. The effort is well worth it as the intelligibility, clarity and comprehensibility of a model improves considerably. The users no longer question these rules as they have proved successful.

So the key to success is shared model development combined with the reusability of models and scenarios?

Exactly. The user community and appropriate processes guarantee a high model quality. In addition, the implementation of the master model approach allows for greater process reliability. The database lists any changes and the respective user who made the change, for instance. It is also possible to track which release testing was carried out with which state of both model and data.

How did you realize the technical implementation?

The master model framework corresponds in its basic structure to CarMaker for Simulink. This basis is enhanced with special model libraries, which also work independently of this approach. Thanks to the many interfaces in CarMaker, we can easily use the enhanced libraries here as well.

So CarMaker is a staple for you. Which advantages does it offer in the development process?

In my opinion, virtual test driving needs to be firmly established in the development process. Only then is an efficient development achievable, especially with regard to the coordination between different departments. Here, we draw on the functionality "DataPool", for instance, which was developed at just the right time for us. Of course, we also benefit from many special features that CarMaker offers, since the modelling of the environment, for example, is extremely important in the field of active safety systems. If we take the V-model as the standard development process, it is safe to say that CarMaker is already used at the top left of the V in a very early stage of the development. That is, during the definition of the requirements, for example the Euro NCAP requirements. This enables us to check already during the definition phase whether these requirements can be fulfilled, before our models are actually developed. Despite the fact that we sometimes use simplified models in this phase, this approach has produced very good results.

How do you imagine real and virtual test driving to be used in the future?

In the foreseeable future, testing the real vehicle for validation will still be the last stage of the vehicle development process. Due to additional features as well as the interconnection of functions, I believe that the test effort will increase considerably. The need to still run tests at an early stage and the difficulties concerning the availability of real vehicle prototypes will lead to an increase in virtual tests.

Having successfully implemented the master model approach, it will stay an essential part of the Opel development process. What is next in this success story?

We are currently observing a continuous growth of the user community. Other departments that work with virtual test driving are interested in using the master model as well. This benefits everyone since the model pool will grow and contain even more well-developed and validated models. In addition, the optimized shared development does not only have a positive impact on our company, it also facilitates the cooperation with suppliers. It is very likely that we are looking at a future with a much larger user community.

Thank you for the interview, Mr. Schaffnit!

PROFILE

Dr. Jochen Schaffnit

Dr. Jochen Schaffnit is a Technical Integration Engineer Chassis Controls Simulation in the department of Vehicle Performance Simulation for the automobile manufacturer Opel. The range of development includes standard aspects of vehicle dynamics as well as the entire field of active safety.