

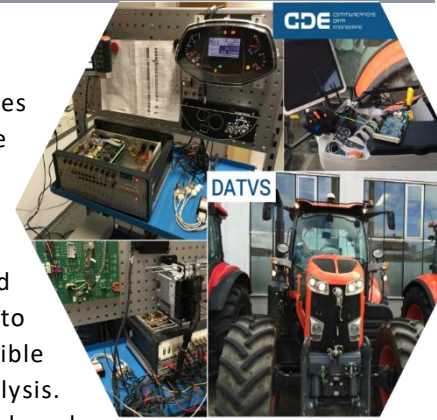


Rapid verification of new functionality features for tractors and medical devices

Challenge & Solutions

Tractors and other off-road vehicles have strongly evolved from just plough-pulling machines to complex systems allowing for a huge variety of functions. New digital technologies have enabled many innovative, efficiency-enhancing functions such as autonomous farming applications using GPS data or automatic transmissions driving very diverse farming machines. As for any product, the safety and reliability of new features must be tested in realistic environments before finding their way to commercial markets. In particular real field tests add significant costs and delay time to market. They are not really reproducible due to varying real-life conditions. Software glitches occurring during field-testing are nearly impossible to fix, because there is rarely an opportunity to take the vehicle back to a garage for error analysis.

In a EUROCPs experiment an Automatic Test and Verification System platform has been developed to shorten testing time and to improve testing quality. By integrating real hardware and virtual components (simulation models), the platform provides a seamless exchange of data and know-how from the concept phase to road testing. It allows plugging the test system into a real environment with the capability to switch between real data and generated stimuli. This affordable hardware-in-the-loop (HIL) system uses remote data tracking in the field to collect data from real vehicles. The data is then used for reproducible test-and-simulation models in the lab. The new solution was applied to test innovative commercial off-road-vehicle features. The system reduces both the testing effort and time by 30-50%. This also holds for application areas that combine generated and real data as part of testing cycles such as medical equipment. For example, the platform was also used to test an innovative type of catheter, which is a highest-risk-class medical device requiring extensive testing before market launch. The PiCSO Impulse Catheter, which is designed for patients with myocardial infarction, redistributes blood flow into the damaged area of the heart. The HIL system's automated testing capability accelerated product development of the mechatronics console that automatically drives and controls the catheter by eliminating the need for costly and time-intensive manual testing.



EuroCPS Support

In this experiment CEA was the DIH that helped to bring the technology provider AVL and the SME CDE together. As catalyser, CEA set up the process of technology transfer and supported the technology transfer between the technology provider and SME throughout the experiment in real time.

Digital Skills

CDE-CommunicationsDataEngineering (SME): Embedded systems, wireless connectivity, web&apps, security, NFC, data mining, predictive analytics

AVL Graz (techno provider + design centre): Integrated & Open Development Platform (IODP) for integrating simulation models, test beds, data & devices

Company

CDE is a security and communication technology company based in Hagenberg Osterreich (AUT)



22 employees

Partners:
AVL Graz - Aut

Since
2011

Impact/What's next

CDE is an Austrian embedded hardware and software company. Thanks to the enormous gain in testing time and effort an agreement with a major, new customer has already been signed. Furthermore, discussions with multiple potential customers are underway. New medical-equipment applications are being developed. New business models suggested by these enhanced capabilities offer the potential to diversify CDE offerings into mobility, industrial services and energy-supply industries. It is expected that the revenue will increase by 30 percent by 2020. Moreover, the company estimates that reusing components, tools and skills will boost earnings by more than 10 percent.



EuroCPS is an European funded project gathering several design centers in order to boost and initiate synergies between innovative companies, major CPS-platforms and CPS-competency providers.

