New software tools for railway signaling and energy distribution

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New tools to improve the design of embedded software systems in automated railway signalling and smart energy distribution are being developed as part of a multi-million Euro project lead by researchers at the University of Southampton.

Professor Michael Butler, Head of the Electronic and Software Systems Group at the University, is coordinating the Advanced Design and Verification Environment for Cyber-physical System Engineering Project (ADVANCE), which begins tomorrow (01 October).

The EU-funded ADVANCE project, which involves Alstom Transport, Critical Software Technologies Ltd, Systerel and two universities, Southampton and Düsseldorf, will deliver methods and tools for formal modelling, verification and validation, which will make it possible to produce precise models for embedded systems and help eliminate design errors before projects go into the manufacturing stage. The project will run for 30 months and these tools will be applied to by industrial partners in the project.

Professor Butler says: "Critical infrastructure, such as railways and energy distribution, rely on large complex software systems and software design errors are expensive to fix and can have a detrimental impact. We are producing formal modelling and verification tools so that system designs can be tested earlier and improvements made before any commitment is made to the final design."

"Formal modelling and verification can significantly improve the quality of the system validation process", says Jose Reis, Principal Consultant Engineer at Critical Software Technologies. "Formal methods improve the quality of the analysis phase by forcing the systems engineer to analyse a broader space of problems."

In ADVANCE, the consortium will use a software toolkit, named RODIN, which is open source and was initially developed in the EU FP6 Rigorous Open Development Environment for Complex Systems (RODIN) project 2004-2007 and the EU FP7 Industrial Deployment of System Engineering Methods Providing High Dependability and Productivity (DEPLOY) 2008-2012.

The major impact of the ADVANCE methods and tools will be to reduce the cost associated with formal modelling and verification while increasing the benefits obtained. This will provide a competitive edge to European systems engineering companies allowing them to further strengthen the leading position of Europe in development of high quality embedded systems.

Provided by University of Southampton