



**Dr. Christian El Salloum**

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## **AVL List GmbH, Project leader CRYSTAL**

Christian was an assistant professor at the [Institut für Technische Informatik](#), Real-Time Systems Group at the Vienna University of Technology. He has studied Computer Sciences at the Vienna University of Technology and received the Dipl.-Ing. (Master's) degree in 2003. In January 2008, Christian El Salloum has finished his doctoral studies in Computer Science with [Prof. Hermann Kopetz](#) at the Technische Universität Wien as research advisor. Today he works as a project manager at AVL List GmbH and is the technical project coordinator of the CRYSTAL project.

## **European Initiatives on a Common Interoperability Specification for Cyber-Physical Systems Engineering**

*This talk will first introduce CRYSTAL as the current interoperability flagship project and give an overview of other related projects in this field. The second part of the talk will depict the vision of a wider organizational structure enabling efficient collaboration among all relevant cross-project stakeholders in order to ensure sustainability and to foster industrial acceptance of the common Interoperability Specification.*

The development of cyber physical system requires multiple engineering competences across various engineering disciplines. It is a huge challenge, also because of the heterogeneity of engineering tools involved in development platforms across the development lifecycle. In order to overcome this challenge, past and on-going EU research projects have developed the basis for an International open standard for development tool Interoperability, the so-called Interoperability Specification. This standard will allow loosely coupled tools to share and interlink their data based on standardized and open Web technologies (e.g. OSLC “Open Services for Lifecycle Collaboration”) that enable common interoperability among various life cycle domains.

With a budget of more than 82 million Euro and 68 partners from 10 different European countries, the ARTEMIS CRYSTAL project is currently the largest investment of all European projects on this topic. Its scope encompasses software engineering for safety-critical systems in the aerospace, automotive, rail, and health care domains. CRYSTAL builds up on the results of past and ongoing projects to mature the results and to prepare the interoperability standard for industrial uptake.

CRYSTAL is not the only project driving the common Interoperability Specification, but is embedded into a much larger ecosystem of national and European projects like CESAR, SAFE, iFEST, MBAT, EIT ICTLabs CPS IIE, EMC<sup>2</sup> etc. To be successful, it is of utmost importance to set up a sustainable organizational structure as a platform joining all stakeholders, to coordinate all interoperability related activities, especially the formal standardization and further extensions of the common Interoperability Specification. This organizational structure should be implemented in collaboration with standardization organizations, for instance the ARTEMIS-IA Standardization Working Group, ASAM, OASIS, ProSTEP iViP, etc.