

Academia-Industry Matching Event on the Mutual Impact of Industry 4.0 and High-Energy Physics

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ELI Beamlines control system development

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Abstract:

The presentation gives an overview of development of distributed control system in ELI Beamlines. The spatial distribution of control system is natural and follows spatial conditions in ELI Beamlines building and controlled technology. The spatial distribution of control system is covered by network technologies used for communication. In principle the whole control system can be divided into two basic levels: Top level and local level. The top level control system provides high level monitoring without requirements to real time applications and gives also access for the users of the facility. On the other side the local control system has to be capable to provide real time feedback control and synchronization of devices used in the facility. From the technology point of view the top level control system is based on standard server technologies. Technologies used for local control is divided into two areas: Industrial control (eg. vacuum system) and Advanced control (eg. beam diagnostics and data acquisition). Both areas have specific requirements and technologies used. Combination of standard industrial technologies based on industrial fieldbus networks and Micro TCA for advanced control provide high flexibility for all applications in ELI Beamlines. Indivisible part of control system is Data acquisition system. The Data Acquisition system in ELI Beamlines is based on low latency networks (Infiniband, Omnipath) and must be capable to fulfill requirements for high volume inline data processing. Technologies, approaches and lessons learned during development of distributed control system in ELI Beamlines have similarities with potential applications in new approaches in the industry.

About the speaker:

Pavel Bastl graduated in 1995 and finished his PhD study in 2001 at the Czech Technical University in Prague. His study was focused on Control systems and Mechatronics with application to control of redundant robots. He is currently with the Department of System Engineering at the Institute of Physics of the Academy of Science, which acts as the coordinator of the ELI Beamlines - the largest research project in the history of the Czech Republic.

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Session Classification: Cyber-Physical Systems