
PRESS RELEASE

Industry 4.0@HEPTech

Industry 4.0 technologies have widely penetrated industrial and business world and many of them have already been successfully employed in scientific research. However, besides the conferences discussing smart factories, products, manufacturing processes, etc., recently no events have been held to explore the specific links and interactions between scientific R&D and Industry 4.0 technologies. Led by the assumption that high-energy physics (HEP) provides an excellent environment for deployment of technologies of the fourth industrial revolution, HEPTech and the Technical University of Košice (TUKE), Slovakia, organized an academia-industry matching event to explore the mutual impact of Industry 4.0 and HEP.



This unique for Europe forum took place on 15 – 16 March 2018, in Stary Smokovec, High Tatras, Slovakia. It attracted about 80 participants, experts from business and academia. Industry demonstrated a very strong interest not only as a high level of attendance (44%) and a number of speakers but also with the sponsorship provided. The Enterprise Europe Network – Slovakia actively supported the forum and

organized 25 bilateral face-2-face (B2B) meetings to enable cooperation arrangements between interested parties.

Over the two days, speakers from prominent European research institutions and leading companies discussed topics related to cyber-physical systems, modeling and simulation, big data, cloud computing and Internet of Things.

The participants received a warm welcome of the Rector of the Technical University of Košice, Prof. Stanislav Kmet. The HEPTech Chairman, Jean-Marie Le Goff of CERN introduced the network, its aims and activities focusing on the idea of organizing that event. Bojil Dobrev of Sofia University, the leader of the HEPTech's Industry 4.0 Special Interest Group, highlighted the main research areas in HEP that could benefit from Industry 4.0 technologies and the potential impact of Industry 4.0

applications on the European Strategy for Particle Physics, which is now being updated. He challenged the audience with the question whether R&D in HEP was a driver, a user or both, in relation to the technologies of the fourth industrial revolution.

The opening session revealed the vision of the Slovak Ministries of Economy and Education on Industry 4.0, and the efforts of the Business Innovation Centre in Bratislava in providing new approaches and services for innovation management support to SMEs concentrated on their R&D activities and regional development. On this background, the role of the Technical University of Košice and its science park Technicom as an ecosystem integrating business, education, research and development was highlighted. In this context, the importance of the TUKE Start-up Center and Incubator was also acknowledged.

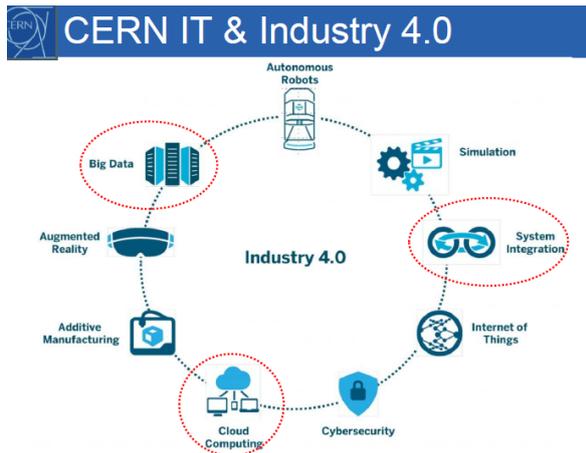


The session on cyber-physical systems provided examples of industrial control systems and detector control systems of large experiments, such as ALICE, at the LHC accelerator at CERN, where the deployed technologies and their implementation share the design principles with Industry 4.0. Another example gave an overview of the ELI Beamlines' 2-level distributed control system and concentrated on the Data acquisition system, which had adopted some new industry

approaches. Siemens presented its holistic digitalization approach over the entire product life cycle focusing on discrete industries. CEIT group introduced an innovative automated logistics solution involving interconnection of systems, on-line information exchange and constant optimization with gradual use of artificial intelligence.

The session on modeling and simulation concentrated on examples such as computing for materials science at the European Spallation Source ERIC and production process optimization based on digitalization and Industry 4.0 technologies in the Slovak industry, provided by SOVA Digital Company. The competence center for acoustics and vibration (PED-VAU) of BSH company in Kosice highlighted the effectiveness of the experimental and simulation methods in the development of NVH (noise-vibration-harshness) measuring stations in industrial production. Brno University of Technology introduced a demonstration testbed for Industry 4.0 that would contain both additive and subtractive machinery technologies, and would have a control system easy-to-extend and able to cooperate with other testbeds. The company ZTS VVU Kosice shared its experience in modelling of locomotion robotic mechanisms using geometric mechanics methods.

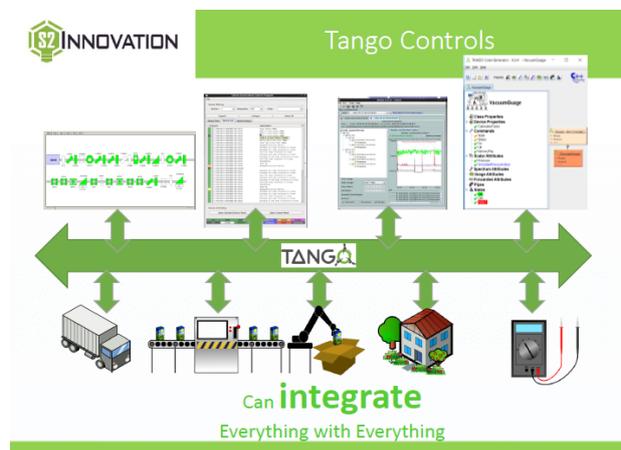




The session “Big Data - Cloud computing” concentrated on data analytics for the purposes of diagnostics and quality control. A typical example in this context was a talk from CERN that outlined core components of the CERN computing infrastructure and their usage for storing, analyzing and distribution of LHC data. Details were given about individual building blocks also used outside CERN for Big Data, Data Mining and Data Analytics as essential technologies for the

transition to Industry 4.0. Another talk from CERN introduced ALICE O2 project, exploring a new approach for handling large data volume in HEP experiments. The predictive maintenance software solutions of IBM, enabling access to multiple data sources in real time to predict asset failure or quality issues, revealed new horizons for academia-industry cooperation.

Industry dominated the session “Internet of Things”, where IBM showcased common solution design approaches for Industry 4.0. Siemens presented MindSphere - its offer for industrial IoT, illustrated with examples of machine connectivity, data processing, archiving and data presentation. The Humusoft company, based in Prague, introduced ThingSpeak - an IoT platform that uses MATLAB simulation software and collects and stores sensor data in



the cloud. The S2Innovation start-up company presented Tango Controls - an open source toolkit developed by a community of European synchrotrons for building high performance and high quality distributed control systems for small and large installations. The toolkit’s features make it perfect for Industry 4.0 applications both for science and industry. A talk from Brno University of Technology focused on embedded video processing for smart cameras. At the end of the session, the TUKE’s research group working on Industry 4.0- and CERN-related R&D presented its activities.

The forum concluded with a round table discussion, which shared the opinion that the HEP R&D could be considered both driver and user of Industry 4.0 technologies.

The event was highly valued by both researchers and industry representatives. Peter Chochula, who is currently responsible for the overall control system architecture of ALICE experiment at CERN, said that was the only conference dealing directly with issues relating to HEP R&D in the context of the fourth industrial revolution and the first one in Slovakia, he had ever attended. “I am impressed by some of the presentations of industry! There are solutions that could be easily implemented in the CERN’s logistics”, explained Chochula.



Marian Filka, Director of the Digital Factory, Process Industries and Drives division at Siemens, shared the same insights. “Scientific organisations can benefit from the companies’ software for product development and process optimization as it is ready to use and is approved by many customers. Some products are with open access and could be easily customized for the purposes of the scientific research”. On the other hand, he is deeply convinced that Industry 4.0 environment demands the strong involvement of the scientific R&D. “We have machines that collect and store Big Data. Out of these Big Data we need to produce artificial intelligence but the algorithm is still missing and the scientific research should invent it”, elaborates Filka.

Jaromir Jezny, CEO of the Kosice-based ZTS VVU, pointed out that in the context of Industry 4.0 the smaller companies expected from the scientific research to provide them with solutions for optimization of the production processes in order to increase the volume and reduce the price of the products. His company has been collaborating with CERN for more than 15 years mainly in the Large Hadron Collider (LHC) building process. Therefore, he emphasized on the opportunity to discuss such issues with CERN researchers.

In general, industry demonstrated a clear vision on its expectations from academy in order to be more competitive in the market. The requirements of the scientific R&D will trigger further development of Industry 4.0 technologies by the companies, and their deployment by academy will in turn increase the efficiency of the research activities.

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