Dear Mustermann,

The option to work from home one day a week has been available to us for some time. In the respect, we were technically prepared for the current situation. Almost all of our staff now works full-time in their home offices and our research projects are continuing almost without any interruption. Only a few members of our technical team are on site to maintain the now cancelled Hannover Messe schedule for completion of the new demonstrator.

The cancellation hit us hard – even if we agree with the decision (Link).
We now have to rethink things. One of the subjects of this newsletter is how to let you experience our new demonstrator? You will also find information about the development of the new demonstrator, *Production Level 4*, our PR activities, and ongoing research projects.

I wish you all the best and good health during this challenging time.

Sincerely,


The PR and marketing materials promised at the general meeting are now available for your use at the links provided below:

Brochures & Flyers:
German: smartfactory.de/en/downloads-info-material

Film:
English: www.youtube.com/watch?v=ME7CNbMSqZ0
German: www.youtube.com/watch?v=0igJ1VzHCKw

Photos:
cloud.dfki.de/owncloud/index.php/s/qf4m2BcpkSrkbSY

(Source: SmartFactory-KL/A.Sell)

Please feel free to use them for your purposes and contact the COM-Team at SmartFactory-KL if you have a question or any other requirements.
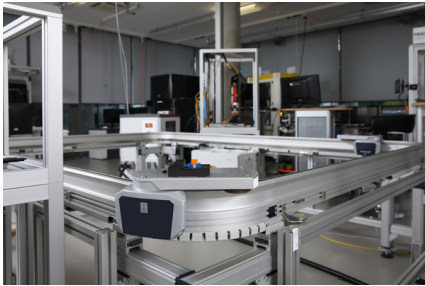
Dr. Ingo Herbst: ingo.herbst@smartfactory.de

Prof. Dr.-Ing. Martin Ruskowski, Chairman of the Executive Board of Technologie-Initiative SmartFactory KL e.V.

## Our new demonstrator

The new demonstrator is a technical implementation of our current research results. It is a practical example of what *Production Level 4* means. We intend to continue development of the demonstrator until 2025. The current version incorporates four innovations.

### Use Case:
The use-case is simple: A customer orders a custom made USB memory stick in the shape of a Lego block. The visual appearance as well as the data to be entered on the stick is selectable. However, the memory stick is not the key focus. We demonstrate a specific manner of production!
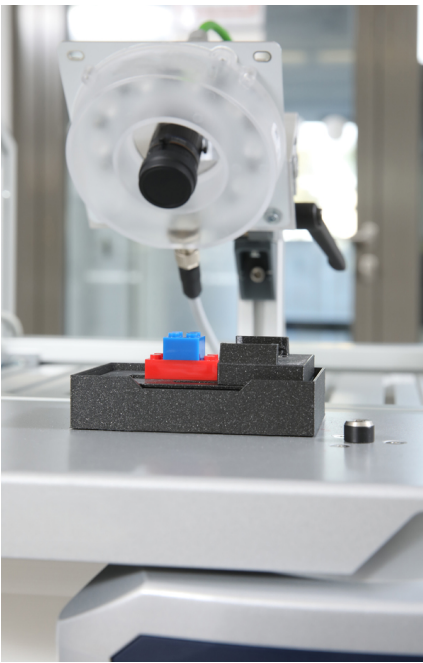
### Interchangeable modules
If the customer selects the option "Save quality control photos to USB," the demonstrator must rely on a special quality module. The activity of the plant is based on functional abilities. If a required ability is missing, an automatic reconfiguration of the plant systems is initiated. The operator is instructed to install the required module. Currently, the two existing quality modules are supplied by different manufacturers and work together in the system without any problem. When a new module is docked, an automated release process begins.

### Gaia-X
The digital connection of the system to other production locations via Gaia-X, the European cloud system, is new. The Cloud, currently under construction, enables secure data connections and data exchange. This feature can be used to trigger production at other locations or to perform simultaneous data updates on the machines.

### AI systems

A special, adaptable artificial intelligence is implemented in the system's quality control module. The AI algorithms work on different levels: in the Cloud, in an Edge data center, directly at the station, or at the sensor.

### System architecture

The innovative system architecture has a modular design. In this way, the system can be easily extended with new features.

## Completed and planned PR and marketing activities

We were able to take part in a Feb. 12, 2020 press preview at Hannover Messe. About 120 journalists from 20 countries visited and talked with 30 selected HM20 exhibitors. Here is a Link to the opening event. There was great interest in *Production Level 4* and our demonstrator. Read the advance Press release here.



Currently, we are in the process of making a short video about the new plant, which can be viewed in mid-May. At the same time, we are working on a "demonstrator digital media experience," where we can dive deeper into the technical matter than we could in a film. This should be ready in July.
We first introduced a digital presentation at SPS. The new experience is similar, although with real images and film sequences that were not yet available for SPS.

Two flyers and an info brochure were to be used at HM 2020. We are now making them available to you  in digital form:

- A flyer about the SmartFactory KL Technology Initiative.
- A flyer about *Production Level 4*.
- A brochure, which lists all the active members who have participated in the new demonstrator and

In addition, we conducted several interviews with some active members: the first releases can be found on our Homepage.

## Background Info on *PRODUCTION LEVEL 4*

Why is it called *Production Level 4*?

The term Production Level 4 with the number 4, is a continuation of Industrie 4.0. We see *Production Level 4* as a kind of upgrade to Industrie 4.0. The number 4 also refers to a level of autonomy. In autonomous driving and manufacturing, Level 5 is defined as the absence of human involvement. That is not our vision. *Production Level 4* emphasizes the importance of people being present in production. That is the definition of Level 4 automation.

What is the aim of *Production Level 4*?

*Production Level 4* means using Artificial Intelligence to gain the ability to have an agile response to external influences and increase the reliability of production. Production systems will become more flexible, more robust, and highly reliable. We want to achieve this through autonomous processes. In the new, extensively autonomous production, people are employed according to their specific abilities and are assisted by intelligent processes.

What will production look like in the future?

It is a flexible production that only produces goods that have been ordered. The future production will resemble an online marketplace, where smart machines are equipped with simple intelligence and offer services and make decisions. In parallel, a higher-level system addresses other problems. In a smart factory, individual products independently move along the manufacturing process. Keywords such as cooperativeness, resource adaptation, self-learning, decision-making ability, and explanatory skills become a matter of routine.

What roles will people play?

At *Production Level 4*, we see fully automated production stations performing more and more of the routine and repetitive tasks on the factory floors. But, more complex activities, especially those involving customized products, cannot and

## Research Projects

Let us briefly introduce three research projects that are currently ongoing and hope to be completed this year.

### Autoware
The higher-level aim of AUTOWARE is to promote an open CPPS ecosystem to facilitate SME access to digitalization technologies.
Term: 10/2016 – 9/2019
www.autoware-eu.org

### FAR-EDGE
The aim of FAR-EDGE is to distribute the monitoring, control, and analysis of production processes, develop Edge servers to store services, support virtualization and the flexible integration of new technologies and devices on a single operating platform.
Term: 10/2016 – 11/2019
www.faredge.eu

### HyProCell
The HyProCell project, based on a combination of LBAM machines (Laser Based Additive Manufacturing) and ICT innovations, develops an integrated, multi-process production station that includes additive and subtractive manufacturing processes.
Term: 10/2016 – 12/2020
www.hyprocell-project.eu

## Interesting Links

New demonstrator & Industrie 4.0 upgrade - Production Level 4
www.dfki.de/web/news/detail/News/hm2020-pl4/

Industrie 4.0 Demonstrator now tangible
industrieanzeiger.industrie.de

Please click here to unsubscribe from our mailing list.