Interface to the future:

# ZELTWANGER further develops the OPC UA standard

## Network machines without any programming knowledge, facilitate data exchange, and define device capabilities: OPC UA is an important step in mechanical engineering towards Industry 4.0.

(Dußlingen, 07/16/2019) ZELTWANGER first became aware of the data exchange standard OPC UA in 2016. Since then, further development of the interface architecture has been an integral element of the company and standard across all leak testing devices. The OPC UA Demonstrator, a project that is exploring the requirements of interoperable communication, was also set up in 2018 in collaboration with other companies. In this interview, Andreas Baur, Managing Director of Leak and Functional Test Systems, talks about the results of the development of the Demonstrator and where he believes the potential of OPC UA lies in general.

## In 2018, you worked together with other companies to create an OPC UA Demonstrator. What were the findings of this project?

This was a special project which involved Zeltwanger working closely with other companies. The Demonstrator that was created was a preliminary result of the VDMA project and is still being further developed today.

The project illustrated in particular what a uniform and semantic description of an IAS system can look like, assuming that interoperable communication is established with OPC UA.

It demonstrates that interoperable communication is possible and needs to be seen as a serious option. This is increasingly being recognized by manufacturers and users. Never before have so many component manufacturers, who are usually in competition with one another, worked together on a project with a common goal. With the Demonstrator, we developed an information model that not only provides data from devices, but also defines device capabilities. This means, for example, that various manufacturers of handling systems can offer the "GoToPosition" capability as an OPC UA method. This capability can easily be called up by other OPC UA participants. This offers users the huge advantage of no longer having to study numerous documents from different manufacturers to find out how they can integrate our systems and devices into their automation system. This enables us to achieve significantly shorter commissioning and more intuitive integration of our systems and devices. What we have in mind here is something like the USB standard for consumer products. Plug-and-work should also work for machines.

## Where is the most optimization required for OPC UA and how should this be implemented?

It is important not only to focus on exchanging data via OPC UA, but also to consider the control technology advantages. To do this, the OPC Foundation must further develop the VDMA IAS Companion Specification and support the routes into capability-based engineering. Component and control manufacturers should also push the boundaries of OPC UA and integrate the technologies into their devices.

## How long has Zeltwanger been involved in OPC UA? Why did you decide to get involved?

Our sister company, Zeltwanger Automation, first became aware of OPC UA in 2016 through the VDMA and through various Bachelor theses. Just like many machine manufacturers, we also sometimes have customer-driven requirements, such as the use of devices from a PLC manufacturer. Back then, we were explicitly looking for a standardized communication method for data exchange between Beckhoff and Siemens control systems in Zeltwanger Automation. This is how we became familiar with the interoperable advantages of OPC UA. This enabled us to develop reusable software tools for control systems from different manufacturers.
Zeltwanger Dichtheitsprüfung launched the ZEDeco back in 2017. This was the world's first leak testing device with an OPC UA server. Since 2018, we have been offering our entire portfolio of high-end leak testing devices with OPC UA as standard at no extra cost. This is unique on the market.

With the decision to implement OPC UA in our systems, Zeltwanger is standardizing data communication in the area of industrial automation and M2M communication. In comparison to fieldbuses, security mechanisms and the semantic structure of the data are specified in addition to the transport of data and interfaces.

The service architecture is transparent as well as flexible, future-proof, and – very importantly to us – expandable at a later date. At Zeltwanger, we emphasize the importance of OPC UA with our huge commitment to the development of a Companion Specification for industrial components as part of a VDMA working group. The Demonstrator mentioned is an important product of this collaboration.

### Why is the topic so important for you? What is its biggest potential?

We want to offer an intuitive interface in our systems and devices using OPC UA which anyone can understand and use without any programming knowledge. At our sister company, Zeltwanger Automation, in particular, we see the potential for a uniform device interface. This is because, as I already mentioned, custom machine manufacturers are often end customer-driven and need to use functionally identical components from various manufacturers. You see this in particular in the field of robotics and image processing. As a result, the more different devices and interfaces a custom machine manufacturer installs in its systems, the more expertise is required for commissioning and development and the less reusable the software code is. This also has an impact on the development and commissioning time as well as on the resulting costs.

### You see yourself as a pioneer in the field of OPC UA. What specific factors do you base this on?

It's simple: We have incorporated an OPC UA server into all our leak testing devices. This makes us the only manufacturer in the world to have integrated a standardized OPC UA interface into all of its devices.

### What advantages can the integrated OPC UA server bring to a specific application as an example?

Customers are always interested in machine, operating, and process data to help them draw conclusions about production quality. If possible, this data should be made available in the same way for every device. To do this, the customer usually has a higher-level control system with an integrated OPC UA client. In its basic form, the data exchange is simply configured and no longer complexly programmed with the definition of bit and byte sequences. This saves time and money and enables the software modules to be reused.
With our OPC UA servers, it is possible not only to monitor the statuses of our devices, but also to control processes. For example, you can start or stop a test sequence using a control system or a controller with an OPC UA client. You can also change or monitor process parameters. This enables our customers to check a measured value via the OPC UA server, for example.

### You have also used OPC UA in the X-Cell. What does that mean exactly? Have you integrated an interface here?

There is no public OPC UA interface in the X-Cell as of yet. We are currently using the OPC UA server of the PLC control system to exchange individual sequences (robot processes) with the X-Cell database.

With our new development X-Cell WB, an X-Cell for loading machine tools, we control the integrated robot via our PLC instead of via the manufacturer-specific robot control system. This enables us to move and teach the robot in via our own user interface. The collected data, such as axis positions and coordinate systems, is saved in our machine database. Alongside control and teaching-in of the robot, it is possible to configure individual robot programs without any programming knowledge. The sequences created are managed in the database. The customer can create an order for each product that they produce on their machine tool, which can then be assigned a robot program. All data for order processing and for executing the robot program is queried from the database via the PLC using OPC UA.

### What added values can be generated by OPC UA that were not previously possible with the X-Cell?

The integration of the OPC UA server allows the customer to query data in the databases for various PLC controllers in a standardized way. OPC UA also enables exchange of large quantities of data. This means that the PLC does not need to be responsible for data storage and can use its resources for actual process tasks.

### What are you currently researching in the field of OPC UA?

We will provide customers of Zeltwanger Automation with an OPC-UA server for the X-Cell, like we have for customers of our high-end leak testing devices. This interface offers them and our HMIs all relevant operating, process, and machine data in a standardized format. We are also planning to provide services for creating orders, programs, and recipes via OPC UA. For this OPC UA server, we are researching a machine architecture that displays the data of the individual objects in a structured manner so that we can create a realistic, digital image of the machine.

### As a user, do I need to make sure everything is ready for Industry 4.0 first, or can I start addressing the issue of Industry 4.0 and using OPC UA bit by bit?

All information and control tasks that are facilitated by the OPC UA server can also be accessed via classic interfaces. So no, you do not need to have everything converted ready for OPC UA communication straight away. The OPC UA server is currently seen as an additional interface for our devices and not as a replacement interface. Our customers benefit from future-proof systems and devices.

## ZELTWANGER Holding GmbH

Technology and quality leader

The Zeltwanger Group has established a well-respected position in the market with its modular assembly and testing systems, which can be constructed individually and flexibly. The main focus is on manually linked “one-piece flow” line concepts and ergonomic single-position systems. In addition, fully automated part carrier and robot-based assembly systems meet customer-specific requirements. The range includes leak testing systems,

modular assembly systems, pin assembly systems, and polishing systems for ceramic substrate. For use in the medical and biotechnological field, systems are created in accordance with European and American standards and the “Good Manufacturing Practice” guidelines.