ANOTHER SOFTWARE FOUNDATION FOR SIEMENS KEMNATH

Uniform, flexible, and intuitive to use – these are the strengths of the Robot Programming Suite (RPS) developed by ArtiMinds. And those strengths were the deciding factor for Siemens Healthineers in Kemnath to bring parts of their production to a completely new software foundation. What started as a pilot project will soon go into serial production.

"Whether in computer or magnetic resonance tomography – the gears, propulsion technology and mechatronics for anything that rotates or moves in Siemens Healthineers devices comes largely from Kemnath", explains Florian Beer. As Project Manager for Robotics and Automation, he works in the process innovation department at Siemens Healthineers AG, which is one of the largest technology providers in the healthcare sector and employs over 66.000 people worldwide.

The site in Kemnath is pushing forward the use of lightweight robots in its production and mainly acts as an internal supplier for the business lines. "In the process innovation department, we are constantly asking ourselves how the manufacturing of our products could look like in five to ten years", states Beer the objective of his department. Hence, he is always on the lookout for future-oriented technologies together with his six colleagues, which includes the area of robotics.

Kemnath produces stretchers, among other things. Stretchers are used to insert patients into the imaging systems of the Siemens Healthineers products. For this, the stretchers are moved horizontally on a linear axis. Until now, the assembly of those axes was mostly done in a manual process which included 280 screws to be set per stretcher in total.

"The work was partly done the head or while bent over, because the screws have to be fed from below as well as from above", states Beer. The component is often rotated and turned during assembly. "The work situation for our employees was very uncomfortable, but a robot does not really care about that", tells Beer with a wink. The robot not only relieves the employees, but it also ensures process reliability: the robot reproduces the process 100 percent identically every time.

By now, the manufacturing of these components at the site in Kemnath is therefore handled by a robotic cell. This is

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"ArtiMinds RPS structures individual program steps granularly, which makes individual assembly processes easier to understand and the search for errors much simpler."

Florian Beer, Project Manager for Robotic and Automation at Siemens Healthineers

The Robot Programming Suite with the ArTIA connector connects the robot and SIMATIC PLC

That is why the innovation department decided to recast the software foundation. Help came from ArtiMinds, which Beer has known since 2018. A pilot project was brought to life in cooperation with the software company from Karlsruhe and the OTH Amberg-Weiden. The pilot project was developed last summer as part of a master's thesis, to prepare the site for the future.
"Two worlds collide in our work", says Beer, explaining the pilot idea. "On the one hand, that of the robot and on the other, that of the programmable logic controller, the PLC. With this project, we wanted to merge both." For that, the team carried out two fundamental reorientations: In the first step, they transferred the control of the plant components to a central PLC. Afterwards, the

already running in series production and is equipped with a lightweight robot and a special screwdriving system among other things. "The solution works so far, but is still strongly limited in some areas", criticizes the project manager. "We have issues with the data transfer for example, especially with the communication between robot and screwdriving system, since the robot used acts as master but does not speak PROFINET." A deficit that could only be solved via digital I/Os. This makes the structure inflexible. Changing the used robot manufacturer would come with a considerable amount of additional expenses.

In addition, there is a lack of granularity in the programming of the individual machines: The lack of intermediate steps and subprograms makes it difficult to clearly structure the overall process. There are cases of emergency where the production has to be interrupted. If that happens, the possibilities to continue the manufacturing process at the correct processing step or to jump to the correct position in the program are very limited. Although the increase in granularity or the option of direct access into the correct processing step would also be possible with the solution used so far, it is planned to implement a master PLC into the current process.

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department unified the robot programming by using a single software: The ArtiMinds Robot Programming Suite (RPS).

Including a special feature: The interface programming between robot controller and SIMATIC PLC is performed automatically by the so called ArTIA connector, developed by ArtiMinds. This interface couples ArtiMinds RPS and SIMATIC STEP 7 (TIA Portal) with the aim, to reduce the interface programming efforts as much as possible and to ensure

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consistent data exchange between robot controller and SIMATIC controller. "I am not aware of any alternative tool that can merge control technology and robotics in this way," summarizes Beer.

User-friendly handling

Beer is highly satisfied with the choice: "ArtiMinds RPS speaks with almost any robot. So even if the manufacturers vary,

we do not have to start from zero and learn the programming respectively the programming languages again." The software also automatically structures the generated robot program congruently to the process steps. If needed, the granularity can then be further increased. "This makes the individual assembly processes more comprehensible. The search for errors also becomes much easier and the room for maneuver is greater in emergencies", explains Christopher Abel, Senior Business Development Manager at ArtiMinds. "Nothing stands in the way of future adaptations or extensions with this high degree of flexibility in the digital overlay."

A big plus for Beer is the user-friendly handling of the software: "ArtiMinds RPS is very intuitively designed. With a two-day training and a little familiarization, using RPS anyone can program a robot within a few days. Programming knowledge is not required." As robotics experts are rare on the market, this advantage makes the software so attractive to Beer. The department also regularly works with students who initially lack the appropriate robotics expertise. This means that junior colleagues can also quickly program and optimize robot cells using drag-and-drop, and long training periods are a thing of the past.

From concept to test operation in just eight months

The pilot phase started in July 2021. Only eight months passed from conception to implementation to testing. In February 2022, Beer drew an initial intermediate conclusion: "We see a clear additional value in the programming of our equipment. That is why we decided to take the pilot project from 'proof of concept' to serial production." When using RPS, Beer's team does not limit itself to the screwdriving process - in the future, it will also be used to automatically measure the shifting forces on the linear axis of the produced stretchers. These have a direct influence on haptic behavior and user-friendliness, as the axes should be movable as easy as possible for the end user.


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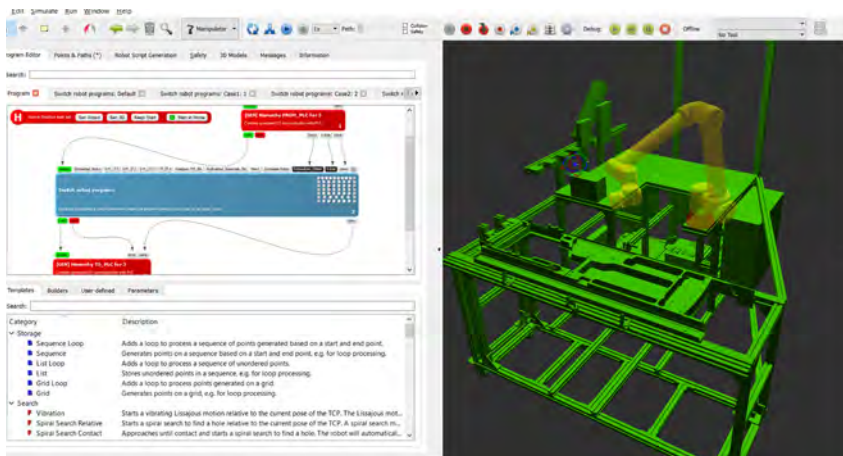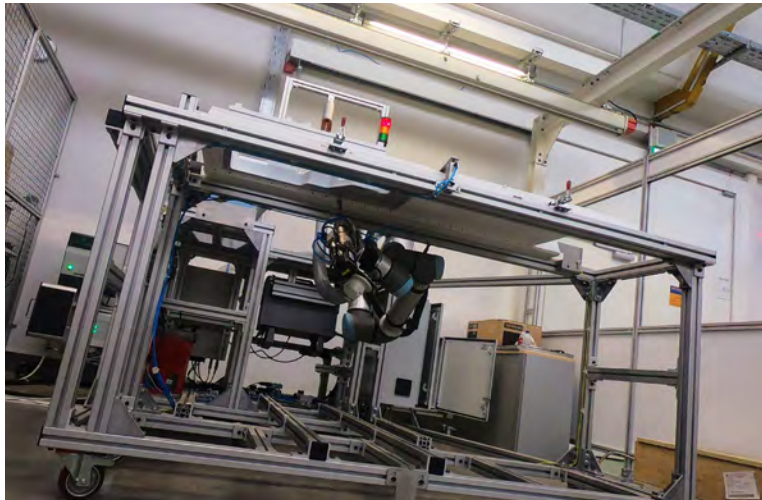
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In addition to the product itself, Florian Beer is also impressed by the support he receives from ArtiMinds. "In every pilot project, problems arise that were not anticipated", says the process innovator. "Then we simply made a quick call and worked together to find a solution. For everything else, we had set up a two-week jour-fixe. The cooperation was excellent."

Beer describes ArtiMinds RPS as a flexible, intuitive software with good support. The team from Kemnath wants to further deepen the collaboration due to the good experiences with ArtiMinds RPS. As next step, the process innovation department wants to take a close look at ArtiMinds' analytics tool Learning & Analytics for Robots (LAR). This is expected to advance the automation of grinding processes in the manufacturing of computer tomographs. "The project has already been initiated and the first talks are underway", reveals Beer. "The next step is then a feasibility study."

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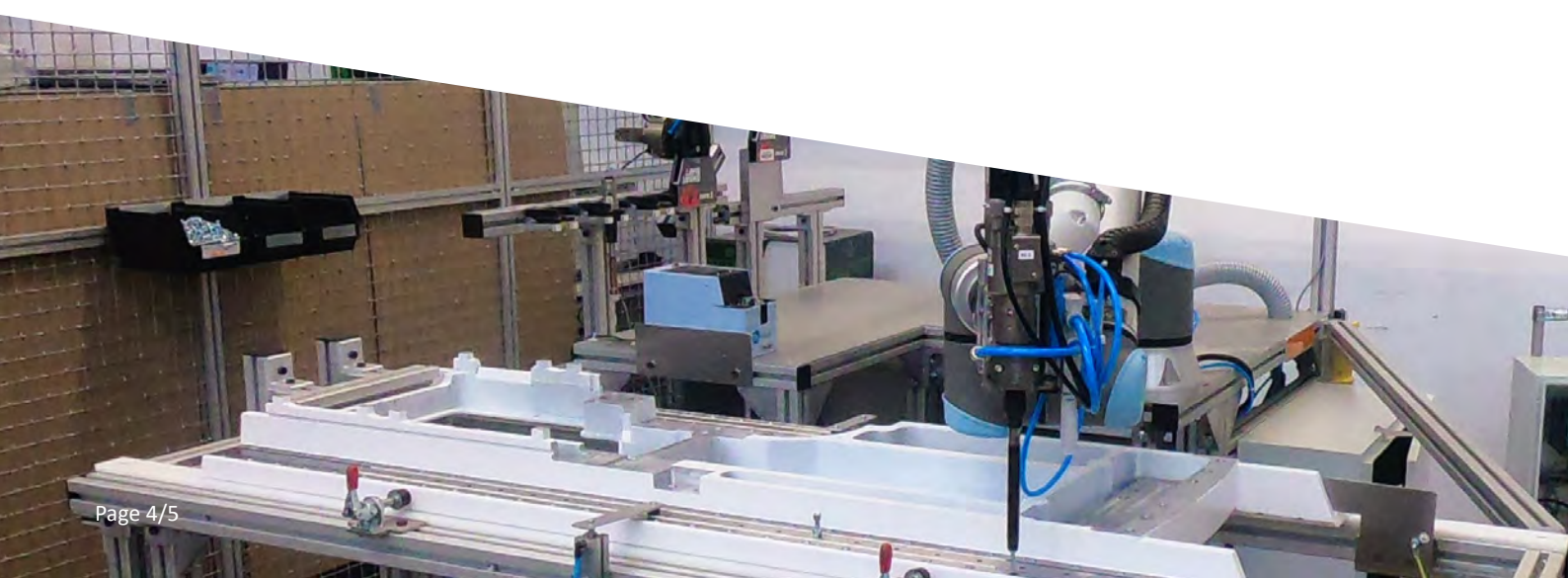
ABOUT ARTIMINDS

ArtiMinds Robotics develops software solutions to standardize the deployment of robot-based industrial automation processes. Our goal is to simplify the programming and operation of industrial robots and to enable cost-efficient integration and maintenance as well as flexible automation.

As a pioneer for sensor-based robot applications, we are familiar with the challenges of our customers and encourage them in implementing their applications independently and building up know-how within the company and securing it in the long term.

With a team of over 40 employees and around 20 international distribution partners, ArtiMinds Robotics serves customers from a wide range of industries worldwide.

CONTACT

ArtiMinds Robotics GmbH

Albert-Nestler-Str. 11
76131 Karlsruhe
Germany

Phone   +49 721 96694781
Fax   +49 721 96694708
Email   contact@artiminds.com
Web   www.artiminds.com