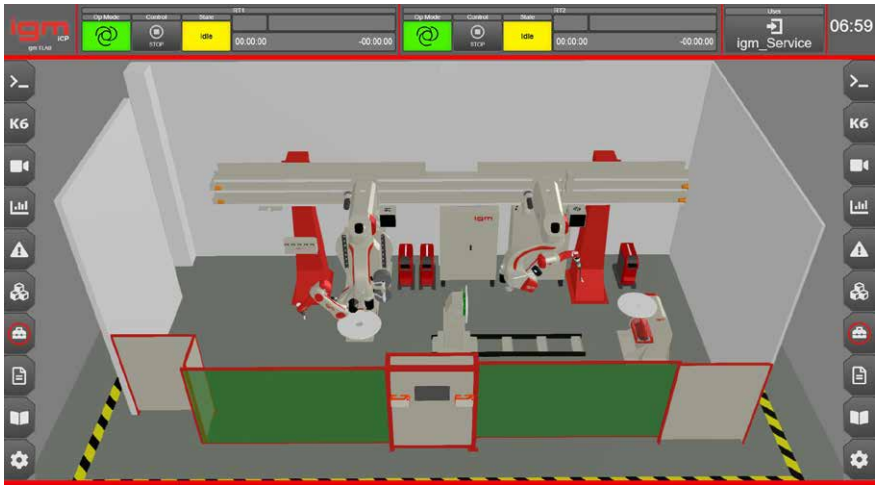
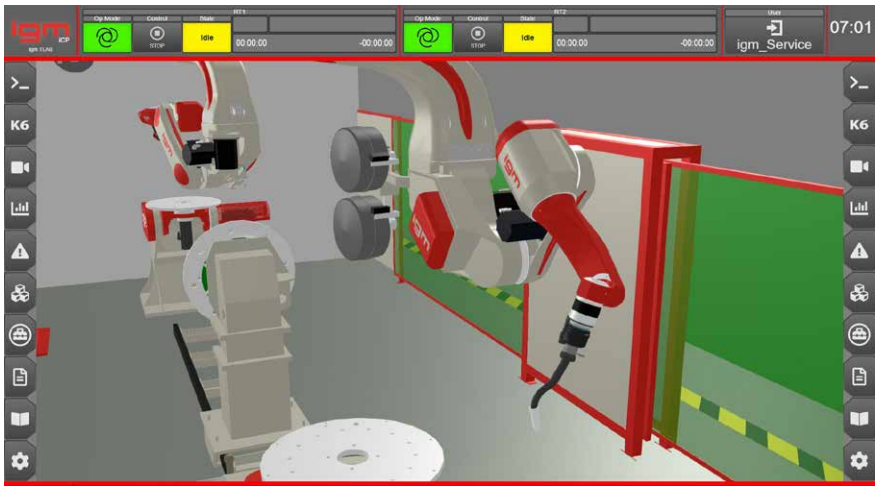
A clear insight in 3D

igm relies on live visualization with atvise® and digifai

What was once science fiction is now reality: igm Robotersysteme utilizes 3D simulations to control welding systems more transparently and efficiently. With digifai and the atvise® platform from Bachmann, a solution was created that links live data with realistic 3D models. The result: shorter commissioning times, fewer errors, and intuitive access to all machine data.



igm systems are often large, complex and difficult to see into. Thanks to 3D visualization, employees can view any desired section in detail. *Images © igm*



For several years, atvise® has been igm's SCADA system of choice for visualization and machine data acquisition. igm's own HMI system, „igm Control Panel" (iCP), is based entirely on atvise®, and performs tasks including visualization, control, program selection and documentation. Machine data is stored in an SQL database and used for analyses: either on site at the installation, or from the office with use of a web browser.

„The operator, working at the installation itself, is generally only concerned with selecting the program and starting the robot. Analyses of the data are mainly of interest to departmental or production managers, who are working in their offices. They open the web browser, access the installation and view its productivity over the most recent shifts. They can then make optimizations, if necessary," says Patrick Palitsch, Deputy Head of Automation Technology at igm Robotersysteme AG.

Virtual commissioning

As for the virtual commissioning of a new welding plant, igm tested the use of a 3D simulation. This led to cooperation with digifai, which uses its twin simulation software to create advanced 3D simulations and digital twins for automation systems.

The web-based architecture of twin and atvise® enabled the two systems to be integrated seamlessly. twin not only permits realistic representation of complex systems in 3D, but also links them to live data and interactive information on components, states and processes. The aim was to extend the existing visualization with addition of an intuitive 3D live view – for greater transparency, efficient commissioning and optimized control of installations.

Live 3D simulation on the machine

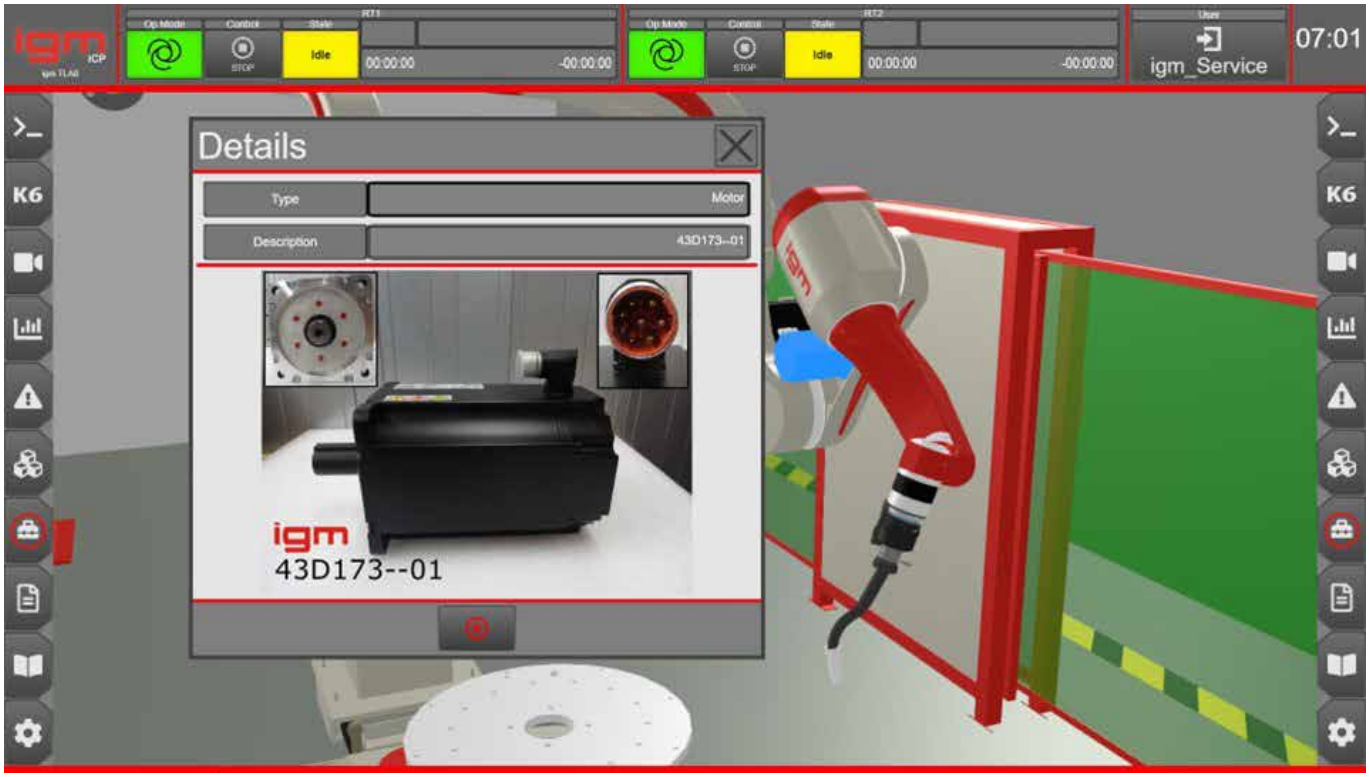
igm's systems are often physically large, contorted and difficult to view. The integration of 3D visualization must therefore overcome several challenges:

It has to make robot movements visible, especially at welding points that are difficult to see. It also has to enable easy identification of components and spare parts, including direct links to documentation and ordering information. The third important feature is web-based access to machine information, even remotely and without special software.

„When the robot enters the component, you need either a camera or – as in our case – 3D visualization. You can move to any point you choose, and zoom in," says Patrick Palitsch. „But we've also integrated parts list information and replacement parts into the 3D representation. The operator only has to click on the component to view the desired documentation." – The benefits are particularly evident during maintenance and repair: information can be accessed immediately, and handling is significantly more efficient.

Fast, open, standardized

The project was completed within four weeks. This was possible thanks to the



The new visualization not only enables realistic 3D representation of complex systems, but also allows interactive information on components, statuses, and processes to be called up. *Image © igm*

open, web-based structure of the two systems. digifai and igm's solutions were already in use in productive applications. „All we did was to marry the two systems," as igm puts it. The result: the system's operation is accompanied by a live visualization, and clicking on a component calls up additional information on it, including relevant images and documents.

Virtual commissioning for predictive planning

Another highlight of the project is advance virtual commissioning. digifai's simulation enabled potential bottlenecks and conflicts to be identified and eliminated while the project was still at the planning stage. Interfacing the 3D drawing to the PLC simulation enables the commissioning process to be played through realistically in advance.

„You minimize problems on site. Errors, such as a copy/paste error in the PLC, which in a worst-case scenario can cause mechanical damage, show up in the simulation," says Patrick Palitsch. „If I crash into a pallet in the simulation, it's not a big deal. But at the customer's site, where the pressure to have production up and running may be tangible even at an early stage of commissioning, errors like that are expensive and cost valuable time." The advantages are obvious: shorter commissioning times, enhanced safety and a substantial reduction in unanticipated errors in actual operation.

Customer-oriented further development

The project is not a completed job, but forms the basis for ongoing development. Work towards a specific development goal is already in progress: „Besides visualizing robots and workpieces in real time, we're also working on displaying the weld seam in 3D – in other words, visualizing the exact progress of the welding process," says the igm project manager.

Efficient, open, fit for the future

The project at igm demonstrates impressively how the combination of atvise® and 3D technology delivers modern automation solutions that are not merely technically impressive, but also suitable for implementation in real-case scenarios. The benefits for commissioning, maintenance and operational monitoring are self-evident.

„Cooperation with our two partners went without a hitch. When a problem crops up, we can always resolve it quickly," is how Patrick Palitsch sums up the working relationship.

Looking to the future, one thing is certain: for igm, 3D visualization is not just an innovative tool, but an essential part of ongoing product development and customer retention.

»You can move to any point you choose, and zoom in.«

Patrick Palitsch
Deputy Head of Automation Technology
igm Robotersysteme AG

igm Robotersysteme AG is among the leading suppliers of automated technology for the welding of large, complex components. Depending on the welding task, solutions ranging from tailor-made compact cells to large gantry systems up to 100 meters in length are used. They also involve the use of igm manipulators, capable of handling components weighing up to 50 tons and positioning them for the robot. With over 4,000 systems installed worldwide, igm offers custom solutions for industries including earth-moving machinery, railway and crane construction, forklift truck manufacture and mining.

digifai develops practical software solutions for industrial automation. With products such as twin, the leading all-round simulation software for digital twins, and control, for IoT-based monitoring, digifai delivers virtual commissioning, efficient process monitoring and the digitalization of industrial processes. The brand is part of Eberle Automatische Systeme GmbH & Co KG, an independent systems manufacturer based in Dornbirn, Austria. The company combines many years of automation expertise with the development of innovative software for Industry 4.0 applications.

The HMI and SCADA solutions from Bachmann electronic, which are specially designed for professional automation and control room technology, can be used in all areas of application and industries such as energy, plant and mechanical engineering, maritime applications, and logistics thanks to their generic structure. The modern and efficient architecture of atvise® permits scaling from very small applications with a few dozen information points to large-scale plant engineering with several 100,000 process variables. The use of pure web technologies enables user interfaces of the highest quality to be implemented, while at the same time eliminating the need for installation on HMI devices: Instead, visualization is available on all devices with a standard browser and is independent of screen sizes and resolutions.

igm Robotersysteme has developed a combination of 3D simulation and live data with digifai and the atvise® platform from Bachmann. Operators and production managers gain completely new insights – whether on site or from the office. *Image © igm*

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atvise.com

CONTACT
atvise@bachmann.info