



A PAD FOR ALL APPLICATIONS

KUKA & RAFI: Working together for more than 20 years

The fascination of robotics: Rolf Mühlhäußer and Markus Frankenhauser are also enthusiastic about the subject.

In 1898, Johann Josef Keller and Jakob Knappich laid the cornerstone for an acetylene gas plant for street lighting. Some 127 years later, KUKA is helping to shape the future of industrial work on a global scale. Together with RAFI, the international automation group with headquarters in Augsburg develops and manufactures control components for its robots, known as smartPADs. The Pro version, designed for advanced handling and performance, is intended for large-scale use in the future.

“With the KUKA smartPAD pro and our new robot operating system, it will be possible to operate any KUKA robot in the future,” says Sergiy Ostrovski, getting to the heart of the matter. As project manager and product owner for all robot control components, he coordinates development. He is responsible for the timeline, fulfillment of market requirements, and adherence to quality and budget. “For me, the challenge lies in developing technical specifications derived from market requirements that are uniquely tailored to each customer’s use case. That’s my greatest source of motivation.”

Florian Sattler shares Ostrovski’s drive. Born in Augsburg, he started at KUKA in 2011 in Production, later moving to Electrical Development and then to Portfolio Management. He has been working in the Technical/Strategic Procurement department for three and a half years. “Automation is growing in significance and improving the world of technology. I always wanted to be part of it.” Originally entrusted with coordinating the assembly of PCBs, he now also supports development projects that take products from the concept phase to series production while always keeping a close eye on technology, materials, and costs.

“With the KUKA smartPAD pro, it will be possible to operate any KUKA robot in the future”

Quality, innovative strength, and customer service as a value proposition

The smartPAD has now been in use for nearly 15 years. More than 250,000 KUKA robots are on the market worldwide. Whether in the automotive environment, in a welding application, in vision systems, or in medical technology, wherever there is an application, there is a robotic solution. And where there is a robot application, there is a smartPAD. KUKA also sees opportunities for growth in the electronics industry, including smartphone manufacturing, while closely monitoring competition from the Far East.

“Our robots are evaluated based on repeatability. We lead the way in both hardware and software,” says Florian Sattler. Sergiy Ostrovski adds: “Software is an important topic. We are expanding the range of our option packages. We tailor our response to each custom-

er’s application, allowing us to address nearly all areas suitable for automation with KUKA robots. Quality and innovation are clearly at the core of KUKA’s value proposition. In addition, there is the proximity to the customers. With a global network of system partners specializing in robot integration, the Augsburg-based company maintains a presence in nearly every country in the world.

High-end ergonomics, design, and aesthetic appeal

The ease with which users operate robots or find the experience intuitive is not a matter of course, but something that comes about from the interplay of many different factors, one of which is monitoring of the market. “We have been attending trade fairs such as automatica for many years. Walking through the halls, the KUKA smartPAD pro is definitely a high-end device in terms of ergonomics, design, and aesthetic appeal,” says Markus Frankenhauser, Senior Hardware Development Engineer at RAFI. It is no surprise that the control components have previously earned awards such as the iF Award and Red Dot Award in the product and design categories.

“We understand what KUKA wants”

Another factor is field research. “At the start of the project to develop a successor model for the KUKA smartPAD, we conducted a workshop together with KUKA and compiled over 40 points directly derived from feedback from operators in production and industrial settings,” recalls Stipan Parić, Project Manager at RAFI. Combined with the KUKA developers’ requirements, a requirement specification was created, following the standard procedures of conventional project management – with the exception that RAFI was able to contribute its own ideas, such as on 2K technology in the area of synthetic material and injection molding.

Between slack and rigorous demands

Based on insights gained from market observation and field research, the next stage began: the concept phase. “All the stakeholders approached the project step by step, working through numerous data sets, rounding issues, and subtle details. “In the end, we arrived at a finished product,” says Markus Frankenhauser, offering a pragmatic summary of the collaborative effort. His “aha moment” – not just for this project, but for all the projects he has supervised at RAFI for years – was when the developer powers on the PCBs for the first time and the CPU boots up; that’s the defining moment for him.

For Thomas Maucher, a mechanical development designer at RAFI, the development of a KUKA smartPAD pro is anything but trivial. “We consider requirements such as ruggedness, durability, and tightness. We also



Compatible with a wide range of applications: For RAFI Project Manager Stipan Parić (on the left), the implementation is a welcome challenge.

focus on look and feel, as well as weight. The challenge is to integrate functionality and design in the most effective manner.” It is evident that these two aspects are interdependent and may not always be compatible. “If you want something lightweight, you have to reduce the wall thickness. This may compromise the sealing capacity or reduce the breaking strength if the pad is dropped. Striking a balance between all the requirements is no easy task.” Balancing trade-offs, like lightweight yet durable, can push developers to the limits of physics. In the end, feasibility determines success or failure. Still, the team steadily works toward a solution that strikes a balance between flexibility and strict requirements.

A “great match” based on a long-standing partnership of equals

For Rolf Mühlhäußer, who works in Sales at RAFI and manages the KUKA account, a clear briefing, short lines of communication, and skilled employees with a high level of expertise are the keys to success. “We understand what KUKA wants,” he says – and offers a simple example. “We know which processor is the right fit, how it needs to be cooled, and much more beyond that.” “A project is never a completely fresh start but builds on years of accumulated knowledge.”

For Sergiy Ostrovski, the collaboration also takes place “on an equal footing.” What’s more, for him it’s “a great match”, as KUKA’s requirements profile aligns perfectly with RAFI’s skills. “A product like this is made

up of more than just software and hardware. Skills and experience clearly play a role here. The development of robotics by us on the one hand and the development of control components by RAFI on the other.” The result is the latest generation of the KUKA smartPAD pro, which, in addition to higher performance, also includes the latest hardware platforms and multimedia processors – all web-based, of course. The robot is rendered in real time as a three-dimensional image on the display – a true visual highlight.

Focus on “Making automation easier” in the future

It goes without saying that KUKA is not standing still at this level but is continuously developing innovative, flexible, and user-friendly robot solutions and control components for the digital IoT era. Under the slogan “Making automation easier,” the focus is on factors including the development of intuitive software and comprehensive services for commissioning and maintenance. Unpack and get started right away – that’s the guiding principle, seamlessly integrated with the customer’s network architecture. KUKA is also setting new standards in human-machine collaboration, especially in the field of autonomous mobile robots (AMR): operators can now carry out routine tasks together with the robot without the need for a safety fence. Or, as Florian Sattler puts it: “Our environment won’t get any easier – but we are well prepared.”

Author and photos: Fred Nemitz



A well-rehearsed team (from left to right): Thomas Maucher, Markus Frankenhauser, Sergiy Ostrovski, and Florian Sattler carefully consider every nuance together.



A symbiosis of robot and control unit: the KUKA smartPAD pro offers a wide range of features. The illuminated emergency stop is just one of them.