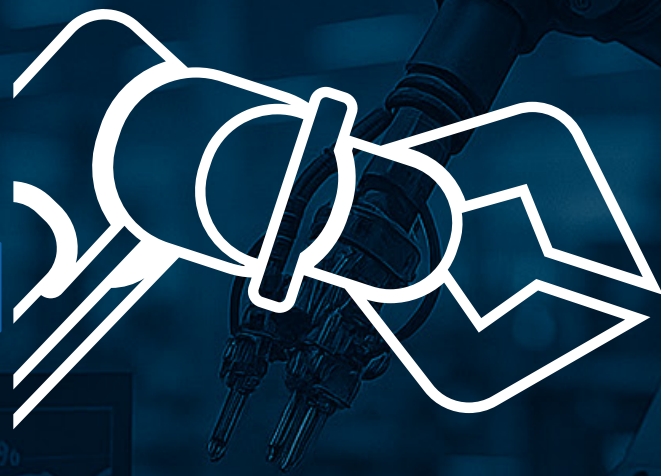


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digitize
Your Production



**Virtual Commissioning
Digital Shadow
Digital Twin**

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RF::SUITE

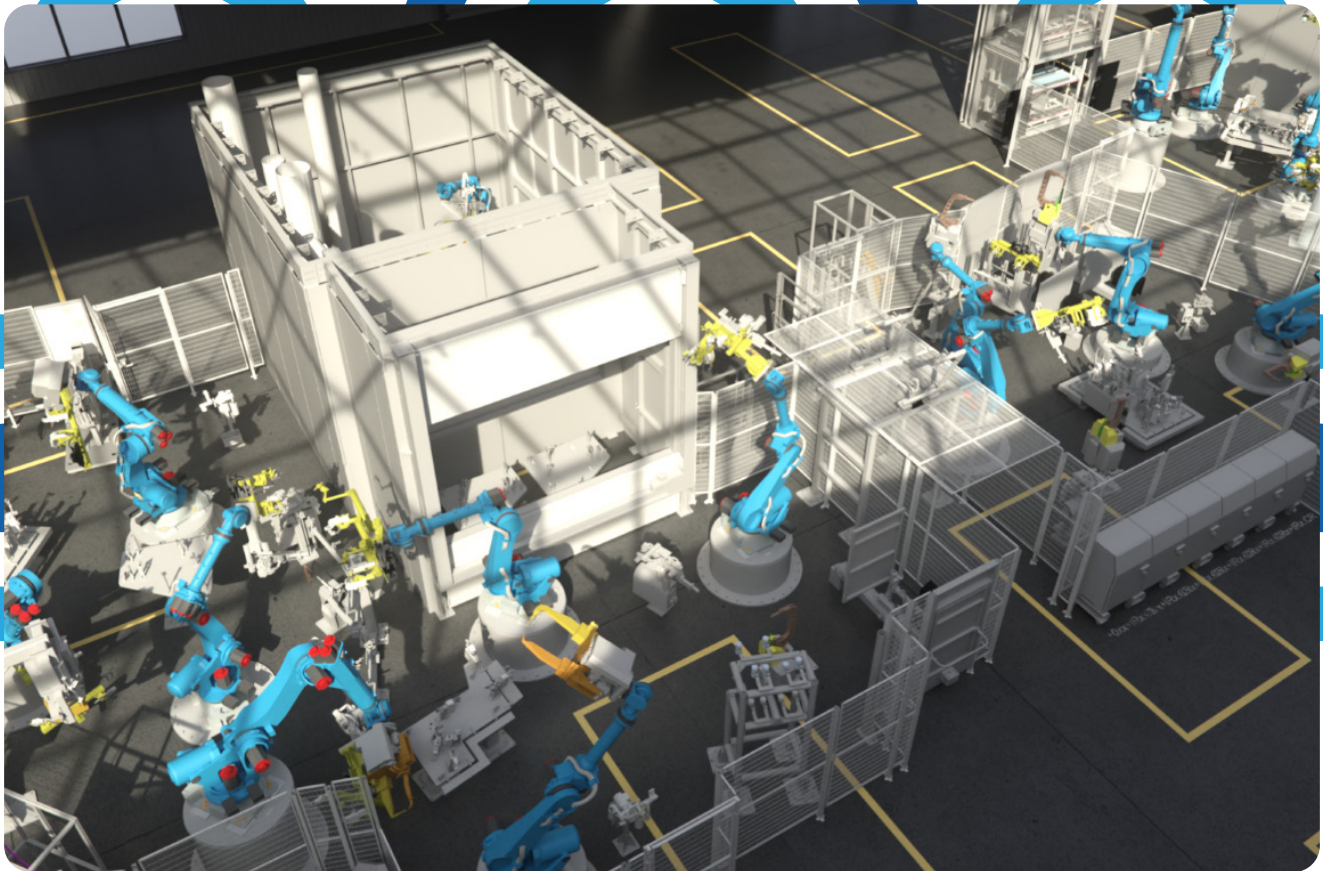


Contact US Now!

Want to learn how RF::SCOUT can optimize your production?

Get in touch with our team — we're happy to provide a live demo, answer your questions, or support your next digitalization project.





INTRODUCTION

WHAT IS IT ABOUT?

Digitalization is taking place in almost all areas of our daily lives. Especially in industrial processes it has been established for many years. Virtual commissioning is already used today in large parts of the industry as well as in mechanical engineering, however with sometimes significant differences in use and the resulting benefit. And now for a few years, the terms digital twin and digital shadow have also been widely used and spread for various applications.

But what is it all about and how can EKS InTec with the RF::SUITE support you in your digital transformation?



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Virtual Commissioning

The commissioning of systems, lines and machines involves some challenges. Some of these can already be solved in the VIBN and/or do not occur in the VIBN, so that the commissioning of the control as well as the process is not affected.

Typical problems:

- Faulty control software
- Problems with mechanical or electrical components
- Delivery difficulties of components
- Missing test products
- Missing personnel on site
- Faulty processes
- and more...

Virtual commissioning cannot of course support with all challenges that arise, but it proves to be an extremely effective tool to significantly



accelerate the commissioning process and reduce the time on site. Furthermore, virtual commissioning also functions as a preliminary check of the data and documents, since the same information is used when setting up the virtual system as with the real one.



Procedure

Virtual Commissioning Process

In virtual commissioning, a virtual image of the real system is first created. The goal is that the controllers of e.g. PLC and robots communicate identically with the virtual model as in connection with the real system.

Data used can be:

- PLC/Robot programs
- MES/SCADA data
- 2D/3D CAD data
- Electrical/media plans and quantity frameworks
- Data sheets
- Process descriptions
- And more...



For most applications, PLC/robot programs, 3D data as well as electrical plans and process descriptions are required.

By using standards and libraries, the setup can be automated. The degree of automation here strongly depends on the data integrity.

Errors in the data and documents are already uncovered in this phase before they later lead to expensive delays. The virtual model is then connected to the controllers in **Hardware-In-the-Loop (HIL)** or **Software-In-the-Loop (SIL)** and first static errors are corrected and a general IO check is carried out. Now it can be started to test the overall process and to correct the programs of the controllers.

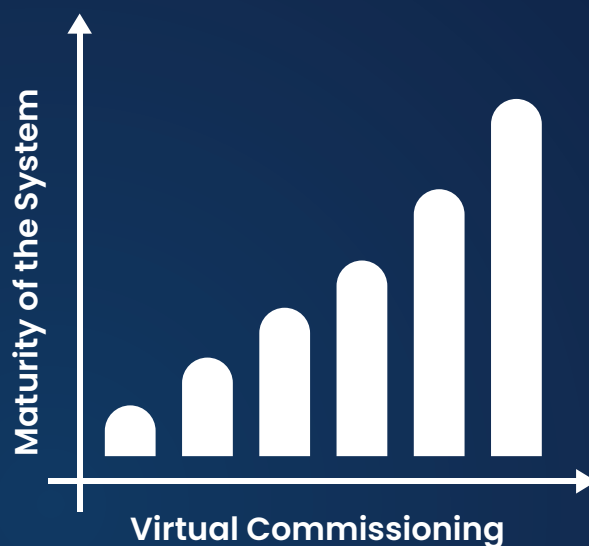
The programs can then be used directly on the real system and focus can be placed on problems with the hardware, since the control has already been fully tested. After actual commissioning, a digital twin is created from the virtual model of the virtual commissioning. To do this, all relevant changes to the plant must also be implemented in the virtual model.

What can be tested in advance?

In advance, a wide range of functions and conditions of the system can already be examined within the virtual environment. This makes it possible to check whether the automation logic interacts as intended, whether timing and process flows are consistent, and whether safety and manual interventions behave reliably. Interfaces such as the HMI can also be verified, and typical operating scenarios can be run through to reveal weak points at an early stage.

Things to test in advance include:

- The control process (automatic operation)
- The cycle time
- Safety functions
- Special functions
- Manual operation
- HMI
- Collisions
- Conformity
- Take in take out strategies
- Restart procedures



DIGITAL WHAT?

While virtual commissioning has been established for a longer time, the terms digital twin and digital shadow are relatively new. The context ranges from an urban digital twin for cities to bio digital twins for cells. The use and the reason for the creation is however the same. Observing the behavior of the digital twin when changing the input data. In the office, almost all conceivable scenarios can thus be tested on a digital twin without affecting the real twin.

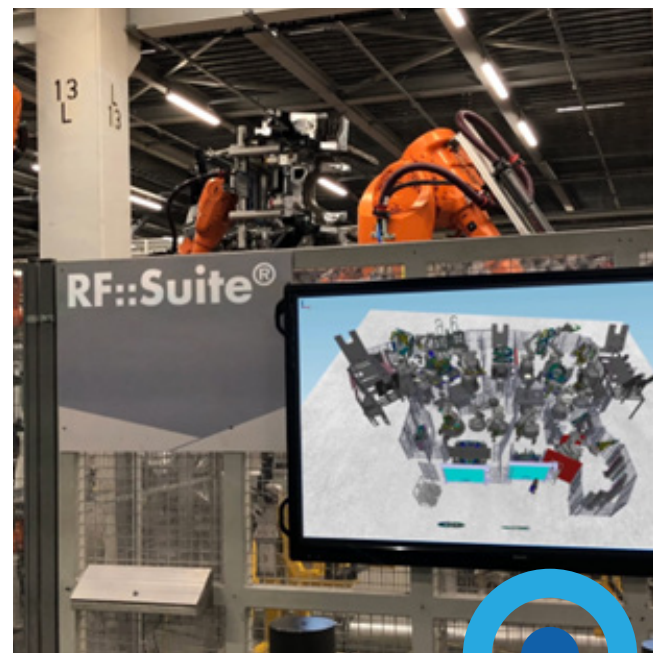


Develop your processes or components, secure modifications, simulate different methods, these works and much more can be done on the digital twin independent of location and time. This creates an unprecedented availability of the test object and the highest maturity level for your implementation on the real twin.

While a digital twin, briefly said, represents a digital image of reality with the same properties, a digital shadow is an image of the states. Live or historical data can be fed to it and the shadow then always takes exactly the same state as reality. Care must be taken that only states that are actually defined via signal communication can be precisely displayed.

The digital shadow can, among other things, be used to carry out optimizations and analyses on

historical data, or also to observe and control processes live that are otherwise difficult to see. The digital shadow can also be enriched with information from other areas or with information normally invisible to the user in order, for example, to facilitate troubleshooting or to get a better overview of the current process.



What is RF::SUITE®

The RF::SUITE® is a modular software suite for process simulation, analysis/optimization and virtual training. Through modularity you can adapt your suite entirely to your needs.



RF::ViPer
behavior simulation



RF::YAMS
3D simulation



RF::RobSim
KUKA robot simulation



RF::VPM Tool
individually adaptable,
semi-automated project creation



RF::SCOUT
process analysis and optimization



RF::EdDi
virtual training



FS::Box
hardware box for bus device simulation
on PROFINET and EtherCAT



RF::RobotConnect
connect tools for connecting to real robots (ABB, FANUC, Kawasaki, KUKA, Reis, UR) as well as the manufacturer tools ABB RobotStudio, FANUC



RF::PLCConnect
connect tools for PLC (Siemens, Phoenix, Allen Bradley, OMRON, PLCSim, Run MyVirtual Machine, OPCUA, SimUnit)



RF::PSA Bridge
connection to Siemens
PLCSimAdvanced



RF::KOL Bridge
Anbindung von KUKA Office Lite



RF::RecV2
data recording

And further tools for special applications.

How we can help you?

For over 25 years, we have been pioneers in the field of virtual commissioning. With our own software – starting with Invision and today with RF::SUITE® – we have continually set new standards.

Since we ourselves implement virtual commissioning projects and develop digital twins and shadows for customers around the world, we know exactly what is required to generate real value with these tools.

Driven by innovation

With RF::SUITE®, you get all the tools you need from a single source to build and use virtual commissioning models, digital twins, and digital shadows effectively. Thanks to our in-house software, our many years of experience, and a broad range of references, we act both as a system provider and as a competent partner to help you bring your data, processes, and applications into the digital age.

Our services include:

- Software
- Software development
- Implementation of virtual commissioning, digital twins, and digital shadows
- Individual consulting and analysis



FROM THEORY TO PRACTICE

Streamlining Production with virtual Commissioning

An international automotive supplier was preparing to launch a new body-in-white production line with multiple robots, conveyors, and safety interlocks. Previous projects had faced late-stage errors discovered during physical commissioning, causing weeks of delays and significant additional costs. The company needed a way to detect issues earlier, validate layouts, and improve collaboration between engineering and commissioning teams.



By using VC, the team was able to create a complete virtual model of the production line. CAD data, PLC programs, and robot motion profiles were seamlessly integrated into a realistic simulation environment. This allowed the company to analyze material flows, test safety interlocks, and verify controller programs under near-real conditions. During virtual commissioning, the team identified several critical issues, including overlapping robot safety zones, inefficient conveyor cycle times, and incorrect interlock programming. All of these problems were corrected long before the physical installation began, significantly reducing project risks.

As a result, the company cut on-site commissioning time significantly, avoided costly last-minute changes, and strengthened the collaboration between engineering and commissioning teams. The virtual environment also provided a valuable training platform for staff, allowing them to prepare effectively before deployment.





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provide a live demo, answer your questions,
or support your next digitalization project.

