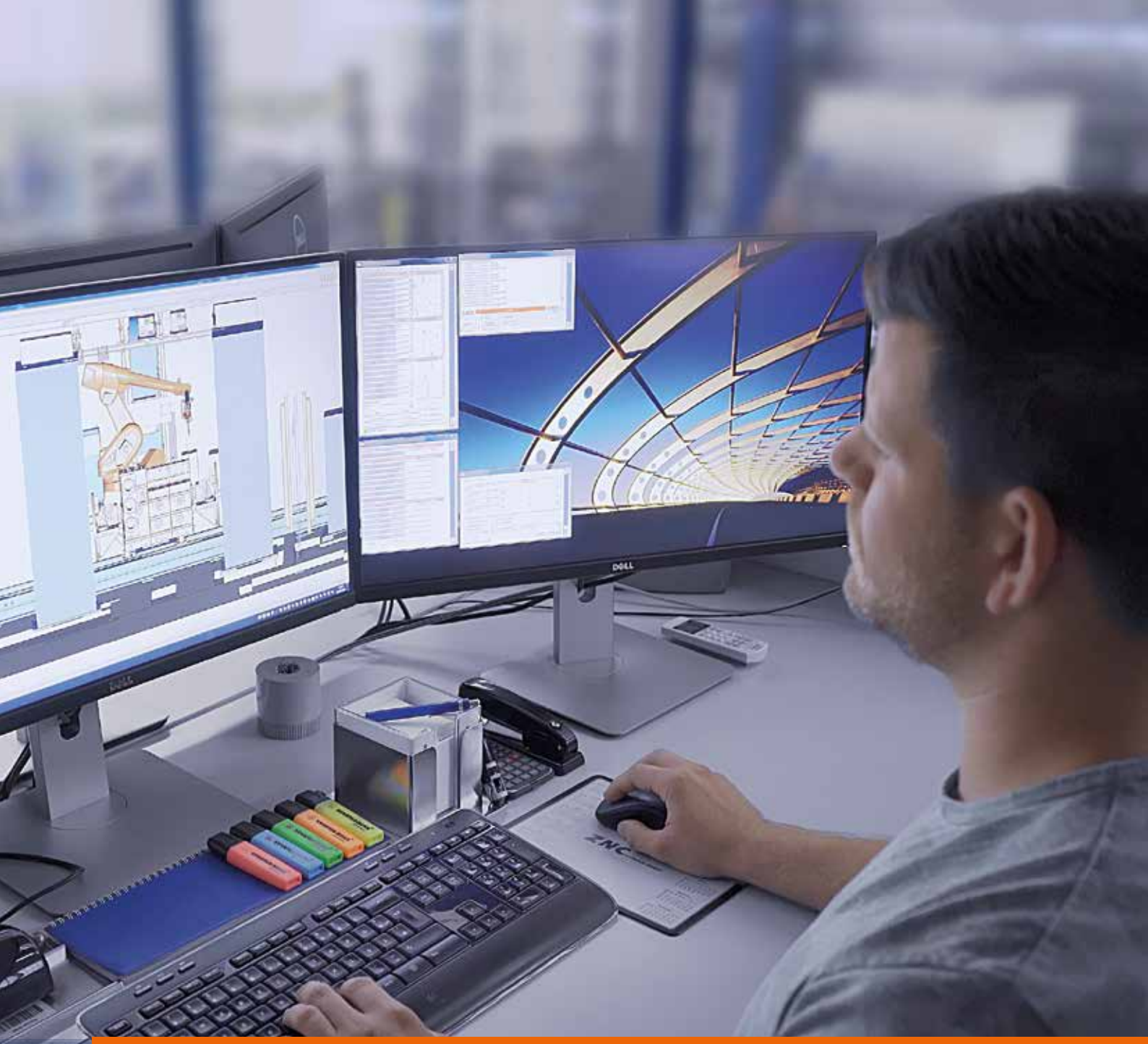


RoboPlan

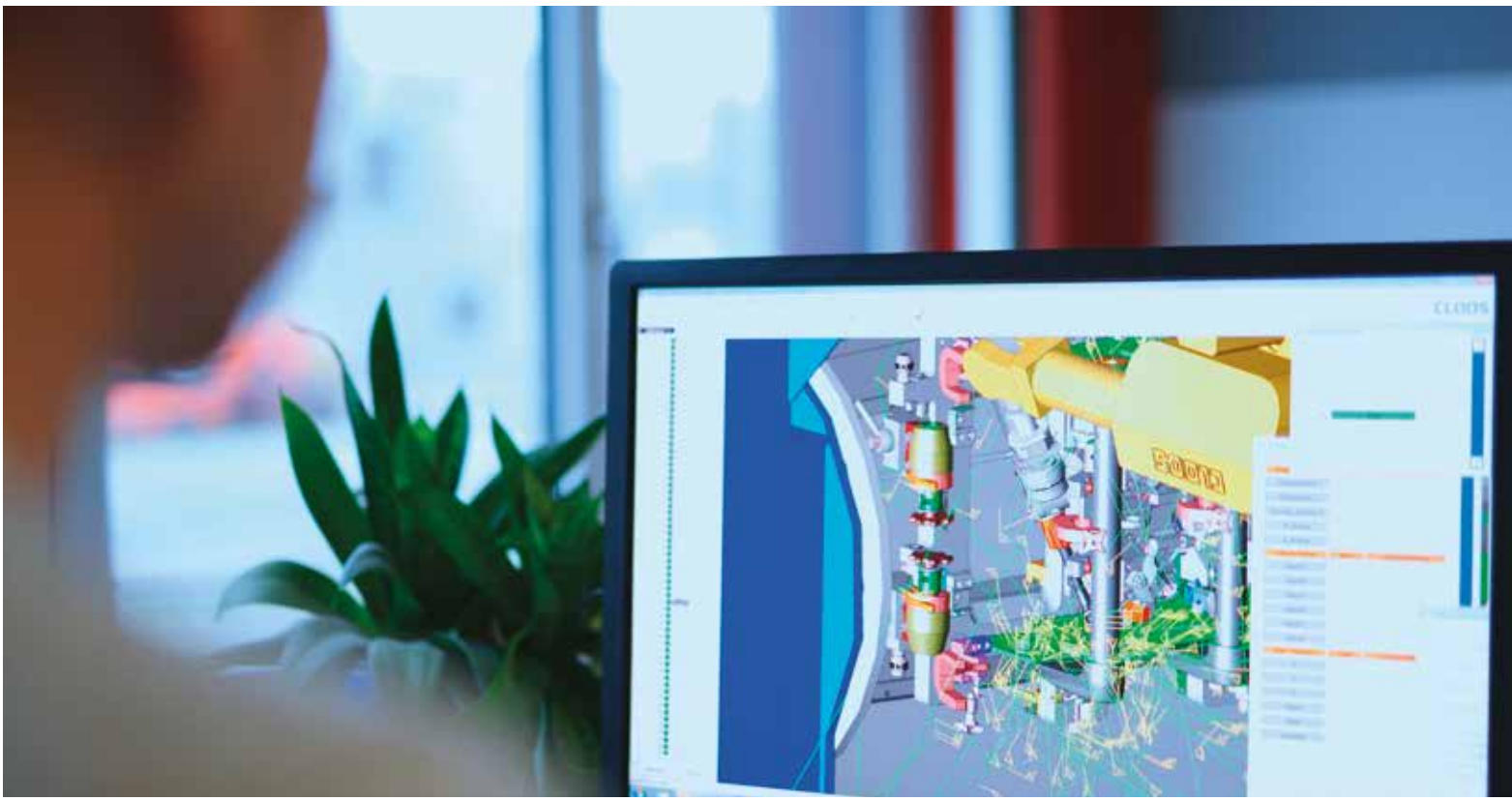
Maximum efficiency with offline programming

CLOOS

Weld your way.

www.cloos.de

Content



Offline programming with RoboPlan

Programming of welding and travel paths as well as sensor routines on 3D models

While the robot system is in production, a new program can be simultaneously produced in RoboPlan. RoboPlan allows the generation of welding and travel paths as well as sensor routines on 3D models and the welding parameters and other functions required for running the program can then be defined. The program developed in this way is transferred into the robot controller directly. This process is less time-consuming than the generation of a new program in the robot system using the TEACH process. Thus you increase the system utilisation, optimise the production process and make your welding production more flexible.

Advantages:

- **Offline programming during production:** Increase of the degree of system utilisation
- **Quick product and component adaptation:** Optimisation of the production process
- **Prototype programming:** Improved production planning
- **More parts within a shorter time:** Higher flexibility

Application examples

Offline programming

AGCO Fendt

Complex production line for high-tech tractor cabs

AGCO Fendt depends on the technologies of Carl CLOOS Schweisstechnik GmbH for welding the safety cabs for its tractors. Manual and automated welding technology work hand-in-hand in the complex production line. It is more than 70 meters long and consists of twelve stations. Up to 23 cabs are MAG-welded per shift in seven systems with a total of 19 robots and at six manual welding workstations. AGCO Fendt uses the RoboPlan offline programming software to create the welding programs for the high number of different safety cabs.

Field of application: Offline programming

1. **Considerable reduction of the programming time:**
   Increase of the robot system efficiency
2. **Access to existing welding process data:**
   Reduced expenditure for welding parameter optimisations at the robot system
3. **Automatic point generation along the workpiece edges:**
   Faster provision of programs for workpieces with complex contours

Small batch size

Steel construction

Flexible robot system for steel construction

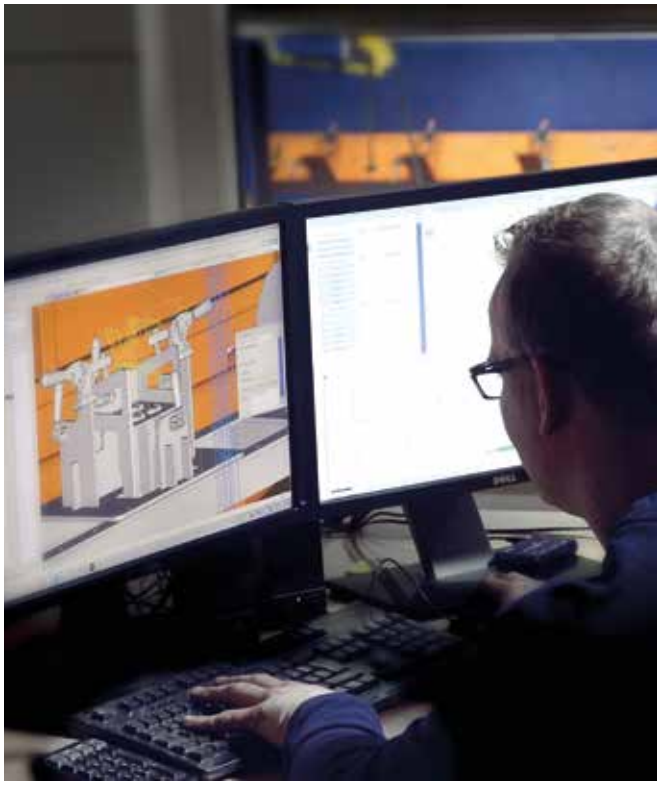
A CLOOS robot system is used for automated welding of complex steel components. The heart of the system are two QIROX QRC-410 welding robots. The robots are mounted overhead to a C-frame and can be moved on the floor-mounted linear track with a travelling length of 18 m from one side to the other. The system can be flexibly used for steel beams of different lengths and sizes. The robot system is programmed offline with the RoboPlan software by CLOOS. Thus the user increases the efficiency and the quality of the production many times over.

Field of application: Small batch sizes

1. **Access to already programmed segments:**
   Faster programming of follow-up programs
2. **Process data library:**
   Quick program generation with direct access to the welding parameters
3. **Transfer of the program data from the robot system to RoboPlan:**
   Provision of optimised program data for follow-up programs

Application examples

Production planning



Glüpker Blechtechnologie GmbH

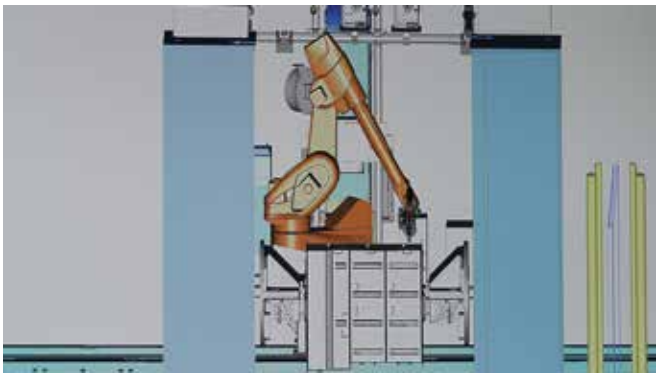
Efficiency through automation and optimised processes

For more than 20 years Glüpker Blechtechnologie has trusted in the welding technology by CLOOS. Today, the sheet-metal specialists use more than 30 robot systems for automated welding. These are both compact robot cells for welding small parts as well as larger robot systems with several robots for the welding of complex components. Glüpker uses RoboPlan for the offline programming of the welding programs. Furthermore, the company uses RoboPlan also for viability reviews, which reveal at what point automation is economical. The high repeatability, process reliability and increased welding speed of the robots are usually the decisive factors here.

Field of application: Production planning

1. **Determination of cycle time and program run times:**
   Comprehensive production planning
2. **Calculation of the production costs:**
   Efficiency check of the workpiece for the robot system

Product development



Fritz Driescher KG

Efficient implementation of the production processes with RoboPlan

The switching systems of Driescher-Wegberg have a modular design and can be assembled individually. But Driescher-Wegberg reacts flexibly to particular customer requests. Due to the wide variety of products, mostly small batch sizes are produced. Therefore, the company uses the RoboPlan offline programming software by CLOOS. While the system is in production, a new program can be simultaneously produced in RoboPlan. By using the robot system with the CLOOS RoboPlan software for offline programming Driescher-Wegberg could increase the welding quality even more and at the same time reduce the production time considerably.

Field of application: Product development

1. **Product development with regard to automation:** Avoidance of expenditure and costs for testing the workpieces and the suitability of tools
2. **Feasibility study:** Quick and free-of-charge examination as to whether the workpiece can be processed on the robot system, taking into account the dimensions and accessibility

Functions at a glance

Path functions

- Rotate and mirror paths, divide and join paths
- Change the processing direction on a path
- Change the processing sequence
- Automatic programming of a path along or around a contour
- Tool distance override (angle of attack, inclination and rotation)
- Independent generation of feed motions between two positions

Transform path

- Generation of new paths by application of spatial transformations
- Specification of transformations (rotations, displacements etc.)

TEACH functions

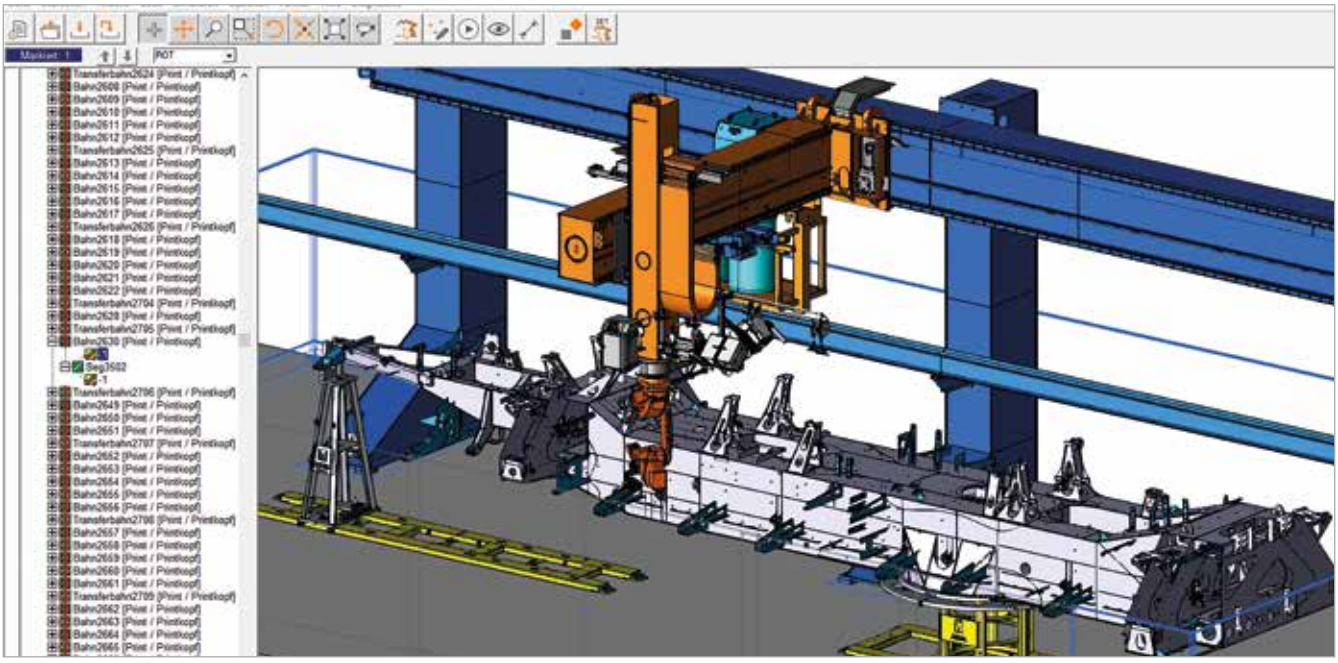
- Axis-specific (PTP) and Cartesian (CP) process
- Synchronous movement of external axes
- Program, approach and delete points
- Browse forward and backward to points
- Insert and delete one or several points
- Absolute or relative shifting and rotating
- Accessibility test with calculation of axis value

Macro

- Saving of complete welding sequences in the case of the same, similar or repeating components
- Application as macro at any point

Video and Screenshot function

- Capturing of simulations as video and detail screenshots



Simulation functions

- Movement simulation robot and external (synchronised) axes
- Display of working envelope violations
- Calculation of cycle time and weld length
- Collision testing
- Integration of PLC functions (clamping tool movement, tool axes, etc.)

Collision test

- Comprehensive collision inspection
- Costs due to possible collisions on the system are avoided with offline tested programs
- Integration of external motion sequences
- Considerably reduced rework of programs in the robot controller

Set and shift axis values

- Shifting of points within internal, external or the cartesian X, Y and Z axes in a comfortable dialogue
- Comfortable shifting and setting to fixed values

Function CAD paths

- Optimised programming due to automatic path generation along the workpiece edges

Programming functions

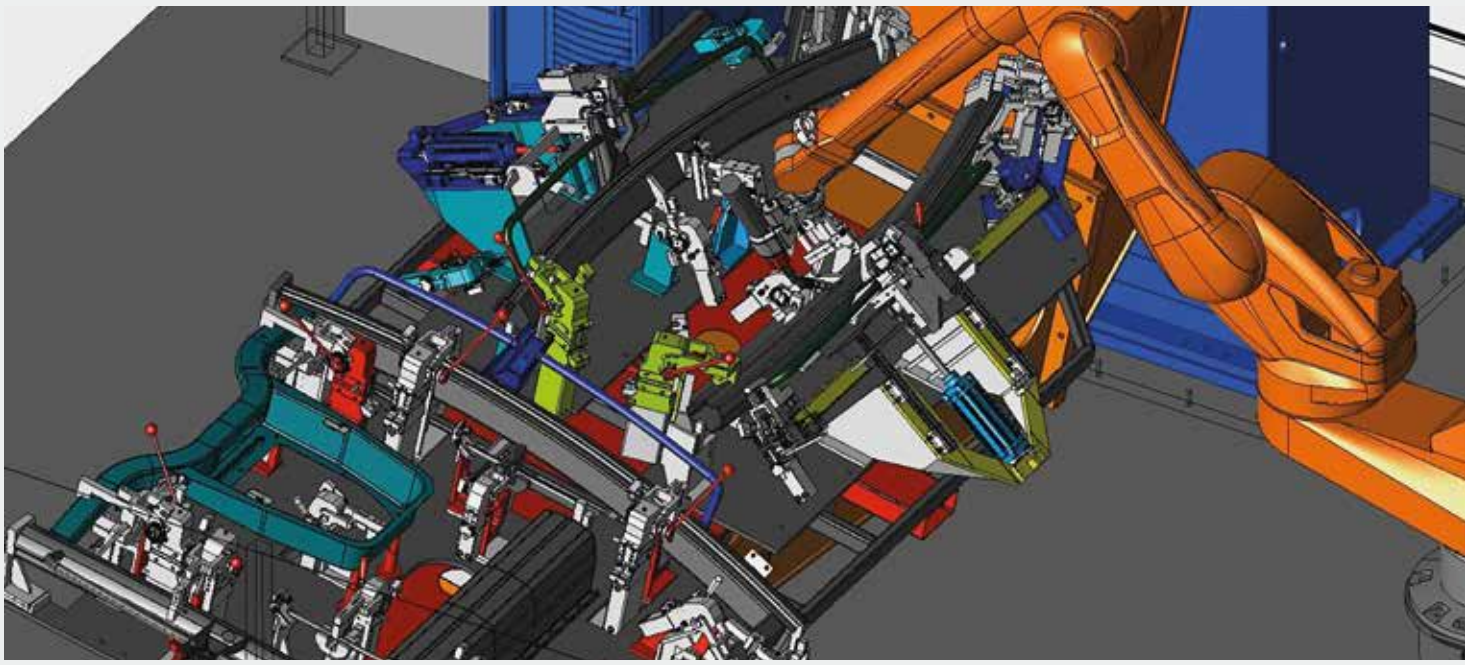
- Automated generation of gravity positions
- Assistance from offline and online laser sensors for the measurement of workpiece tolerances
- Simulation of several robots on one workpiece

MultiLayer technology:

- Automatic generation of points for cover passes of a weld

ToolChange:

- Programming of a workpiece with different geometries (e.g. single wire and tandem welding torch)



Modules at a glance

RoboPlan – optional modules

The optional modules simplify offline programming considerably. In this way you raise the productivity of your welding production to a maximum.

MultiRobot

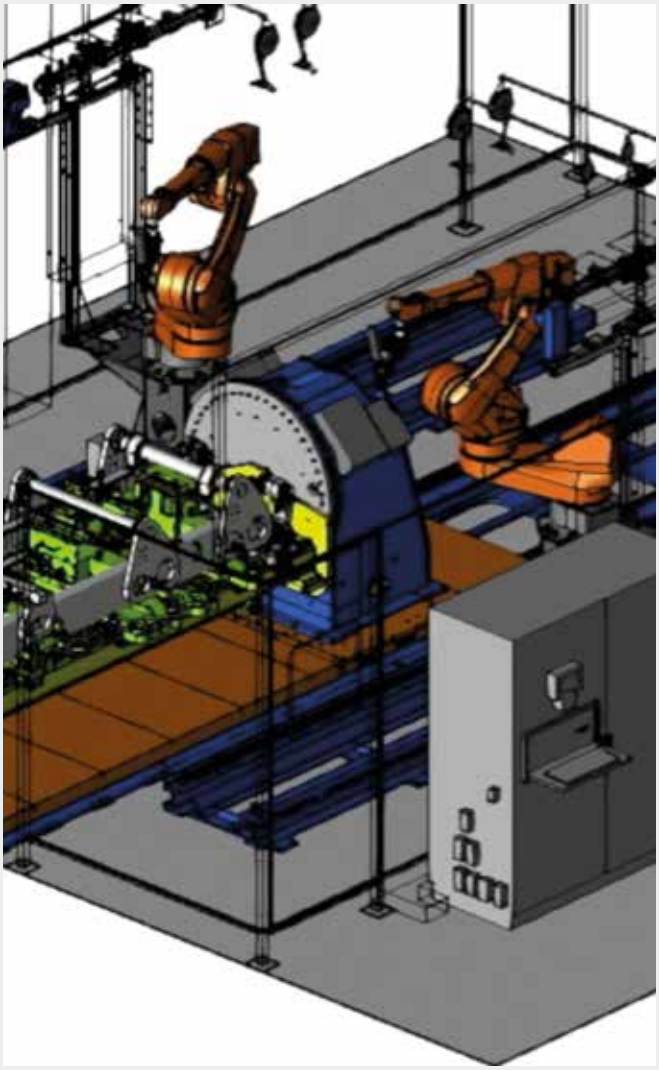
- Offline programming of several robots in a system

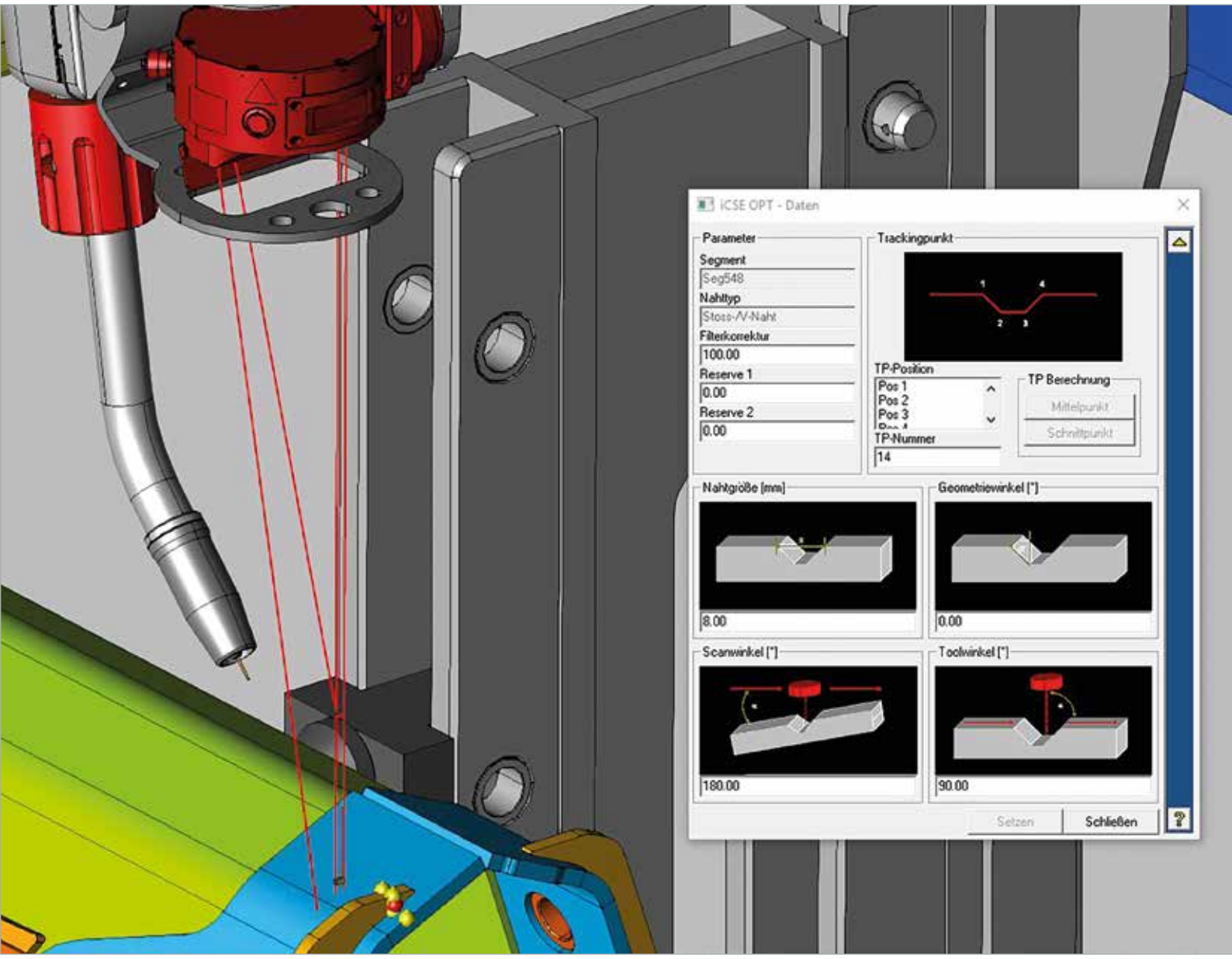
Integration Offline Laser Sensor OPT

- (**OPT**= **O**ffline **P**rogrammable **T**emplates)
  Automatic generation of the templates directly in RoboPlan with determination of the necessary parameters (e.g. sheet thickness and opening angle) from the CAD 3D model
- Programming and integration of the measurement path into the program run

Integration Online Laser Sensor

- Programming of weld start tracking and static measurements in RoboPlan




iCSE OPT - Daten
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TP-Position
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Schließen

Modules at a glance

ShiftPlanning

- Transfer of a program or program section to another working station or to another robot system

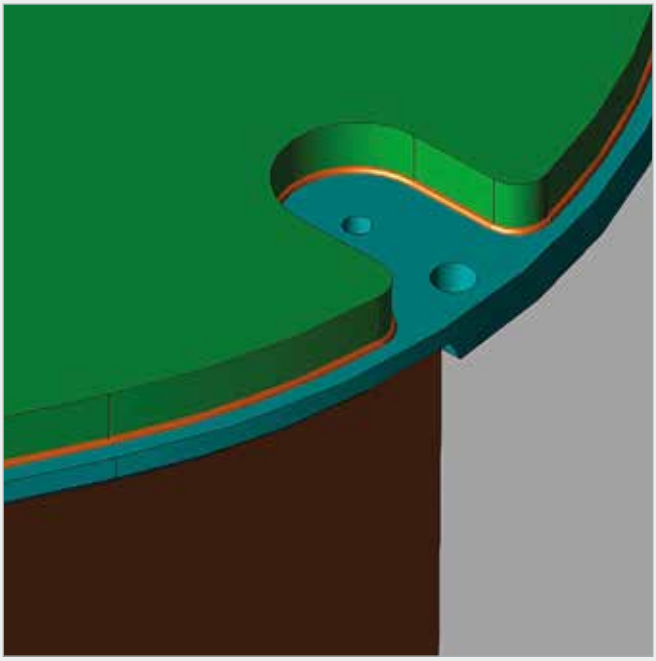
Converter for import formats

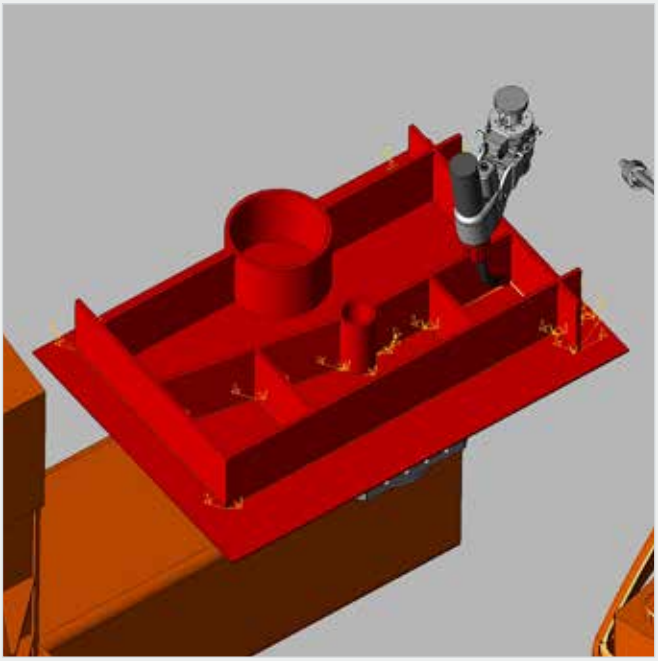
- SAT (ACIS) (Standard)
- Step-Format (Standard)
- SolidWorks (optional function)
- ProE/Creo (optional function)
- Catia V5 (optional function)

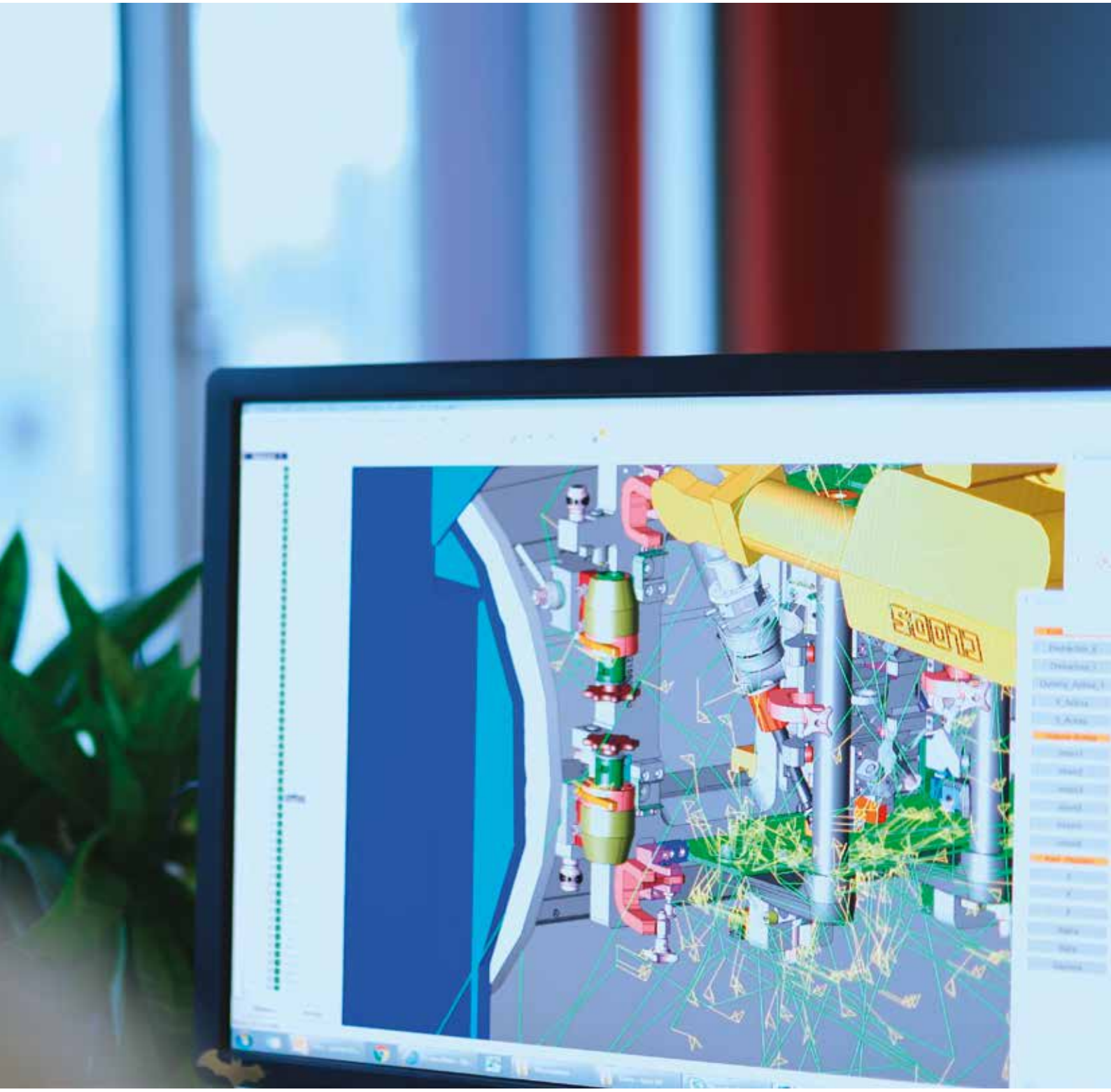
RoboPlan-CAD Interface

The function “RoboPlan-CAD Interface” enables the automatic generation of welding paths on the basis of weld information stored in a CAD system. An extension (AddIn) for the CAD system extracts weld information such as geometric positions and weld thicknesses and makes it available for RoboPlan via interface. From this information, RoboPlan directly generates weld paths.

- Import of welds from a CAD system
- Direct transfer of the weld information
- Connection to different CAD systems







Modules at a glance

Welds from CAD

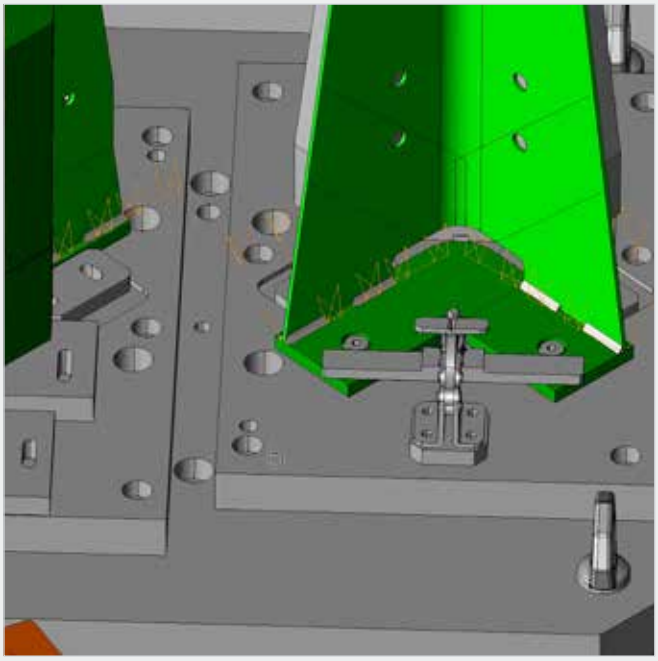
The "Welds from CAD" function automatically detects geometric bodies (prisms and sheet bodies) in the CAD data which serve to mark the weld courses. The welds planned by the user are thus produced at the correct position and directly converted into welding paths.

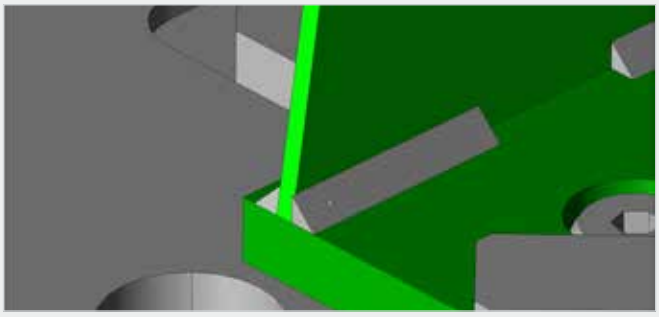
- Fast transfer of the weld courses from the CAD data
- Automatic illustrations and conversion of welds as triangular bodies and sheet bodies
- Reduced error rate

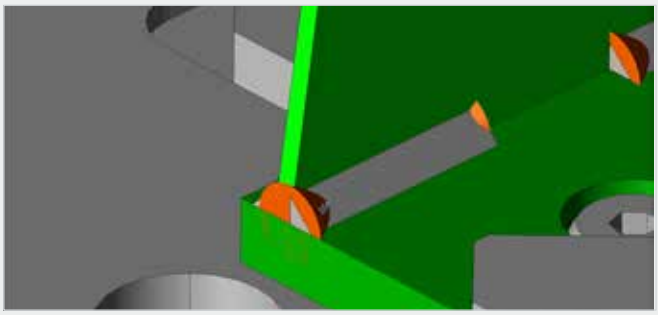
Automatic path optimisation

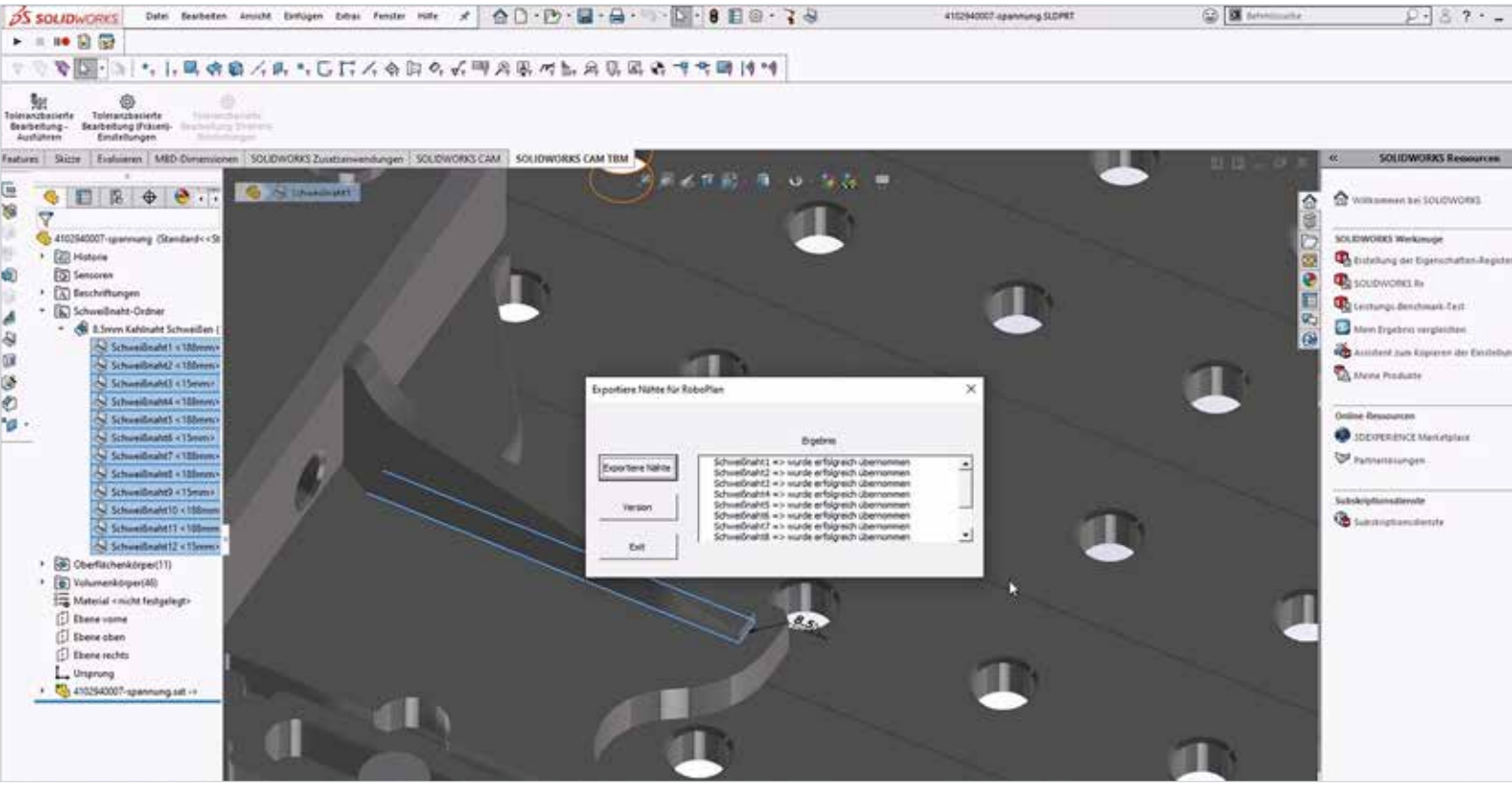
The function "Automatic path optimisation" enables RoboPlan to recognise the component geometry. As soon as a collision of component and welding torch is determined, the torch orientation is automatically adapted according to editable rules. Thus, RoboPlan can resolve collision-afflicted situations in the weld paths.

- Automatic recognition of the component geometry
- Resolution of collision-afflicted situations
- Saving of time because of minimised programming effort





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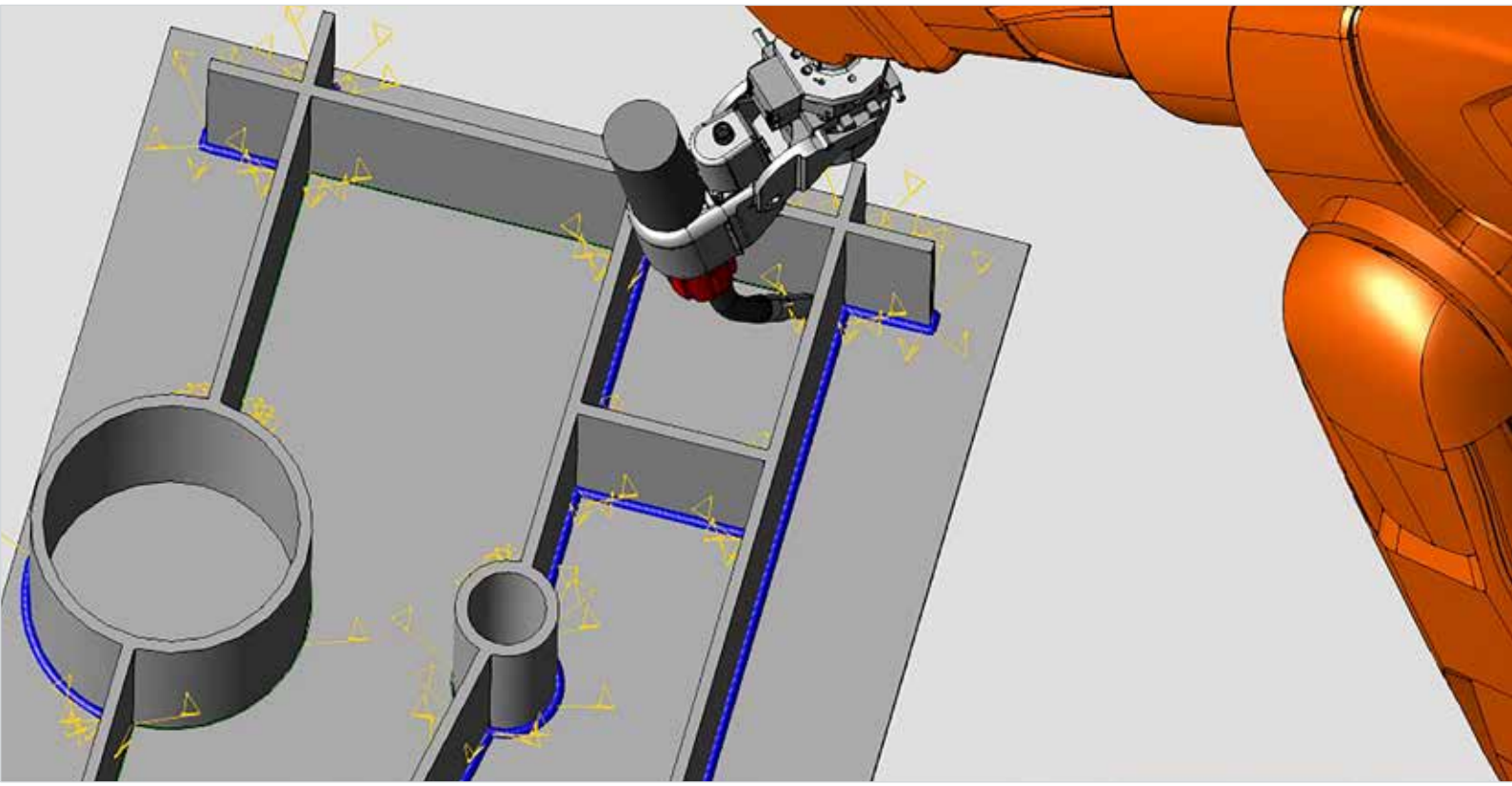
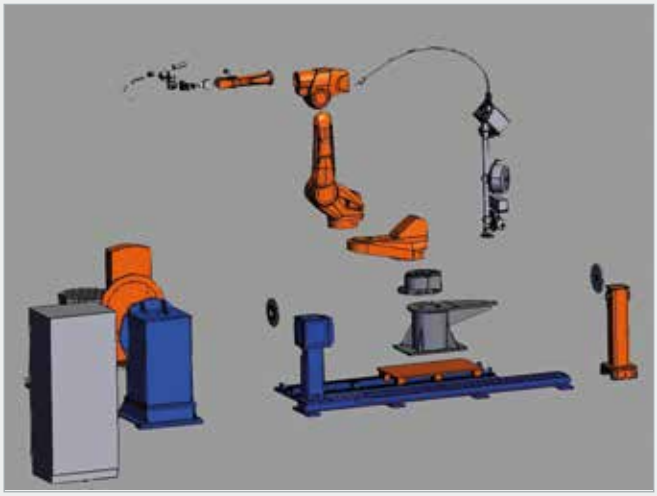


Services

System modelling

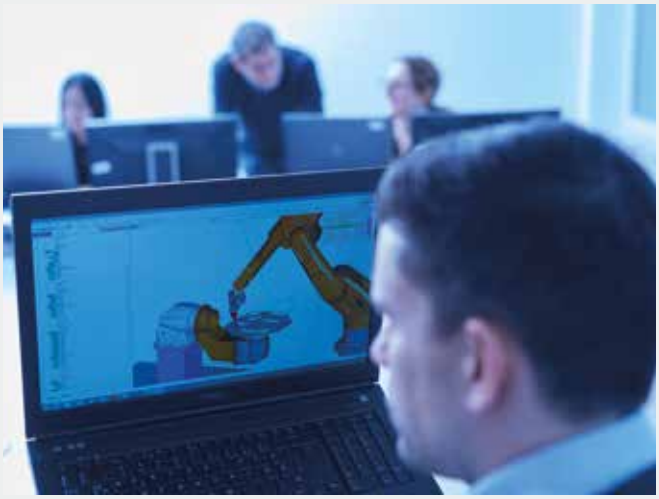
We model your CLOOS robot system. This means that we import the robot and positioner:models, convert your existing data of the clamping tools and workpieces and compose the RoboPlan model of your system of the different components. Thus all functions and advantages of RoboPlan are at your disposal directly.



Seminars

QIROX Software – Offline programming with RoboPlan

This seminar is for robot programmers and users who have to edit, correct and maintain the robot programs. Learn everything about offline programming with RoboPlan. Among others, you learn how to operate the graphical surface, to handle the programming functions and to create user programs offline via RoboPlan.



The way ...

Consulting
With this comprehensive “pre-service”, we take care of your project from the beginning and transfer our integrated process expertise to your component..

Planning
We elaborate a solution which perfectly meets your individual requirements.

Design
Due to the modular design of our product series we develop customised solutions which meet all your production requirements.

Production
Welding machine and robot technology is our strength - including our core competence: the arc.

Commissioning
Our specialists carry out the installation step-by-step in your production hall and test your system for faultless functionality.

Training
We train your employees and service technicians in programming, operation and maintenance in our modern training centre

Service
Our competence team advices you on any extensions, modifications and retrofits of your existing robot and welding systems.

... to your success.

QIROX RoboPlan Maintenance contract

Maximum efficiency: for your welding system

Any hardware is only as good as the software that controls it. QIROX RoboPlan, the offline programming system for QIROX robots, reaches new performance levels for your automated welding processes.
Stay tuned with the latest RoboPlan version so that you keep working efficiently in future - we composed the QIROX RoboPlan Maintenance Contract for you.

Always stay up-to date

You are guaranteed to get free-of-charge automatic updates when we further develop or retrofit our QIROX RoboPlan software. So you will always be ahead of the competition and will work more efficiently than ever.

Become fit for offline programming

The unique QIROX RoboPlan service guarantees help at any time. Use our hotline free of charge.

Reach your targets faster

Our special maintenance contract includes a one-day QIROX RoboPlan workshop run by experts. This workshop takes place at CLOOS once a year. Thus you obtain expert knowledge at first hand.

(Retrofit with maintenance contract from RoboPlan version 6.0).

Always at your service

Our Service Hotline is free of charge and in the case of emergencies is always available for you. Even in the case of products which have been in use for more than 20 years we have the expertise to answer all your questions.

Service Hotline
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Telefax +49 (0)2773 85-275
E-Mail info@cloos.de
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