

VISUAL
COMPONENTS

EMAG's Next-gen Production Plant is being planned with 3D simulation

From optimized planning to risk reduction: the supplier of production lines has a 3D view on all the processes



Plant for the future: EMAG is planning with 3D-Simulation

3D simulation is a direct support tool for selecting machines and processes that will form part of a highly connected digitized Industry 4.0 system. To support their Industry 4.0 digital strategy, the EMAG Group is using Visual Components 4.0 Essentials for 3D layout planning and the Premium version for material flow simulation. The 3D solutions are used during the feasibility stage to evaluate different production concepts and choose the optimum configuration. Seeing the selected option as a running 3D model increases confidence for the acquisition team and reduces the risks with system implementation.

The EMAG Group supplies manufacturing systems for precision metal parts. The company is one of the few manufacturers in its segment, to cover the entire range of processes from soft to hard machining. Automation processes include turning, drilling, milling, gear cutting, grinding, laser welding, induction hardening, ECM deburring, and PECM machining. With the wide range of automation on offer, EMAG is able to provide complete production systems for the manufacture of gearboxes, engines, chassis components, as well as other non-automotive components.

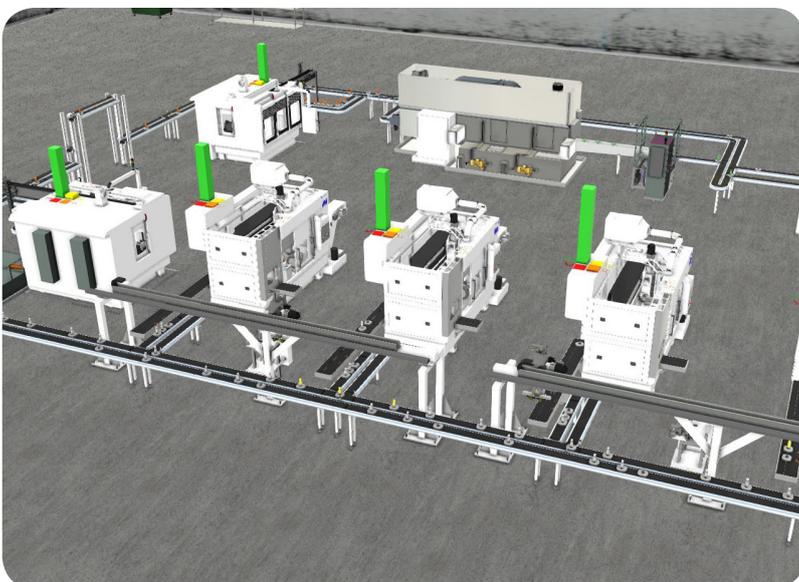
“During the normal course of developing new production systems, we were increasingly faced with new challenges presented by the demands of digital interconnectivity between systems. The control of complex, customized automation systems was becoming more and more difficult. For this reason, we decided to invest in simulation software to help with the problem,” explains Manfred Hummel, Head of Development for EMAG’s CNC software.

The EMAG Group wanted to simplify the problem, ideally, with a single in-house solution. After successfully outsourcing two initial simulations to consultancy firm Authaler + Renz GmbH, the company became aware of the Visual Components software and the local partner DUALIS GmbH IT Solution, who seemed to be the most experienced distributor of the 3D simulation platform in Germany.

In the planning phase for introducing a 3D simulation platform, the project team developed a list of evaluation criteria with specific objectives and required benefits. High on the list was usability, a high level of model detail, and the integration of EMAG’s own simulation models. These factors were decisive in determining that the Visual Components platform would fit the company’s needs.

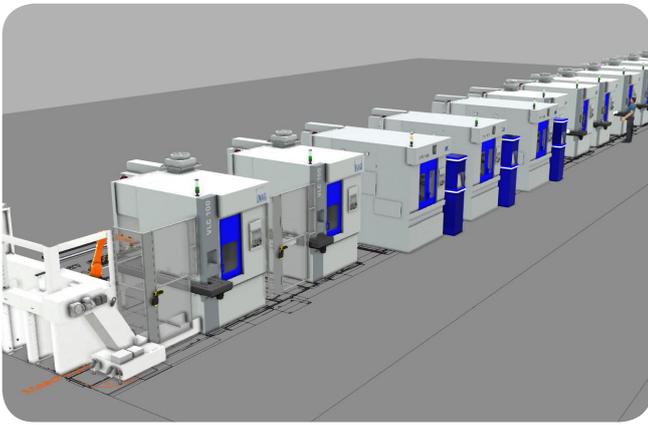
The implementation of the solution

In addition to mechanical, control and mechatronic engineering support, the simulations would also focus on supporting interdisciplinary cooperation between departments, the CEO, customers and any other stakeholders in the supply and delivery of EMAG automation systems.



During the software introduction period several challenges emerged while trying to define a good workflow with regard to interfaces to other software systems, as well as development of basic functions for EMAG’s own equipment models. These were quickly resolved and the implementation was successfully completed during the first weeks of use.

In the beginning, one simulation license was stationed in the “CNC control technology” development department. Now, an additional license is used by the “Manufacturing Systems” department for the layout planning and customer proposals. One more license is



planned for purchase to expand the simulation expertise in the company.

Visual Components in practice

The simulation platform focuses on supporting business processes for the supply and operation of industrial production systems. New 3D production layouts can be quickly generated from existing equipment libraries, using plug-and-play layout tools, intuitive teaching functions, and signal assignment. The result is a visually realistic overview of a new system, with approximate functionality, modelled in a very short amount of time.



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But just approximating the process is not our only goal; we want to implement a realistic simulation of the proposed system, using our own equipment library with simulated kinematics and control logic. The 3D visualization supports us by showing the detailed production processes in the system and allowing us to evaluate them accordingly,”

Paul Friedel, material flow simulations of EMAG

So far, the application of simulation to production system design has delivered numerous positive results for EMAG. Detailed simulation of a customized line early in the proposal phase has clearly reduced the risk of major system integration and commissioning problems. Also the planning quality and number of successful tenders have increased.

“One customer project simulated at the early design phase, revealed a problem with the belt speed that would fail to deliver the required parts to the machines in time, and we were able to redesign accordingly. If we had discovered this during the commissioning phase of the real plant, the associated rework and late delivery penalties would have far exceeded the initial investment in simulation. Even if no major problems are identified with the simulation, it is still satisfying to have confirmation of our

in-house production planning expertise,” continues Wolfgang Lamer – (Manufacturing Systems Concepts and Technology).

Similarly, projects on a very tight time schedule can be better handled with the advanced planning functions provided by 3D simulation. The detailed models show complex processes more clearly and convincingly, and new equipment models complete with kinematic functionality can be efficiently generated from existing CAD data. Completed models can then be exported as a 3D PDF, all of which supports EMAG’s business from the proposal to the commissioning of a new system

Looking ahead in full 3D

With a three dimensional view for the future, more operatives and licenses are planned for 3D layout and material flow simulation. The EMAG Group intends to integrate 3D simulation into all aspects of their customer-specific offer.

Facts-check:

Objective: Visualization of dynamic process workflows, investment security for EMAG plants

Budget: 15.000 €

Introduction year: 2013

Scope of licence: VC Premium, VC Professional

Application field: Layout configuration of automated plants

Interface: Data import from CAD

Ranges of application: Layouting, line-oriented planning, sales project planning



EMAG Group

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automation on offer, EMAG is able to provide complete production systems for the manufacture of gearboxes, engines, chassis components, as well as other non-automotive components. The company offers its customers machines in which several different processing technologies can be integrated. The traditional company is based in Salach and is a cumulation of extensive experience

from all within the EMAG Group and offers its customers modular turnkey manufacturing solutions.

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The DUALIS GmbH IT Solution

Dualis GmbH IT Solution was founded in 1990 in Dresden, Germany and specializes in simulation and planning software. Proprietary products GANTTPLAN, and the ISSOP optimization tool provide detailed planning and optimization of production and manufacturing processes. In addition the simulation tools from Finnish supplier Visual Components deliver 3D planning and optimization for production and logistics systems. Users benefit in multiple ways from the DUALIS products: first during strategic planning and then through operational use. By using a 3D simulation platform, realistic models of complex production

systems can already be evaluated during the planning stage. The plant simulation saves time and costs and ultimately reduces risk. Then when the facility is operational, software based production planning is used to dramatically increase the efficiency of the entire production process. Orders are optimized based on all planning restrictions and available resources, including personnel, fixtures and tools. The ability to meet delivery deadlines is greatly improved through accurate definition of exact delivery dates. By offering production planning and 3D simulation techniques, DUALIS helps companies achieve an optimally designed facility running optimized operations. The realistic 3D

visualization from the VISUAL COMPONENTS suite is not only for internal planning processes, it also supports system integrators and machine builders to convincingly demonstrate their systems benefits and communicate new production concepts.

The Group

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