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Realize
LIVE
For Simulation

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Meeting App
Event Code: 9h7dbh

# Presentation Overview
# Detailed Agenda
# Registration


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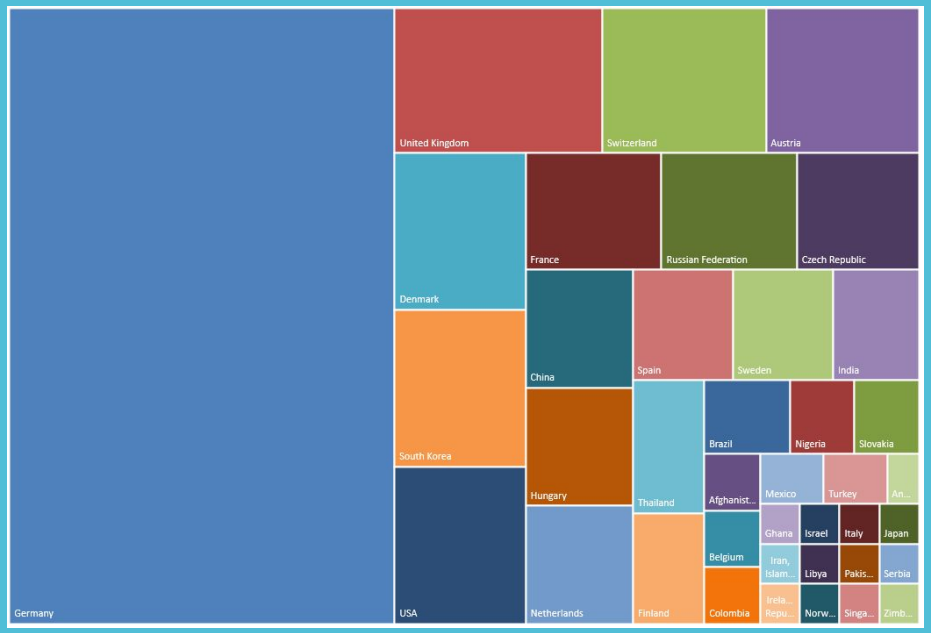
October 15th -17th 2019
Siemens Conference Center
Weissacher Strasse 11
70499 Stuttgart, Germany

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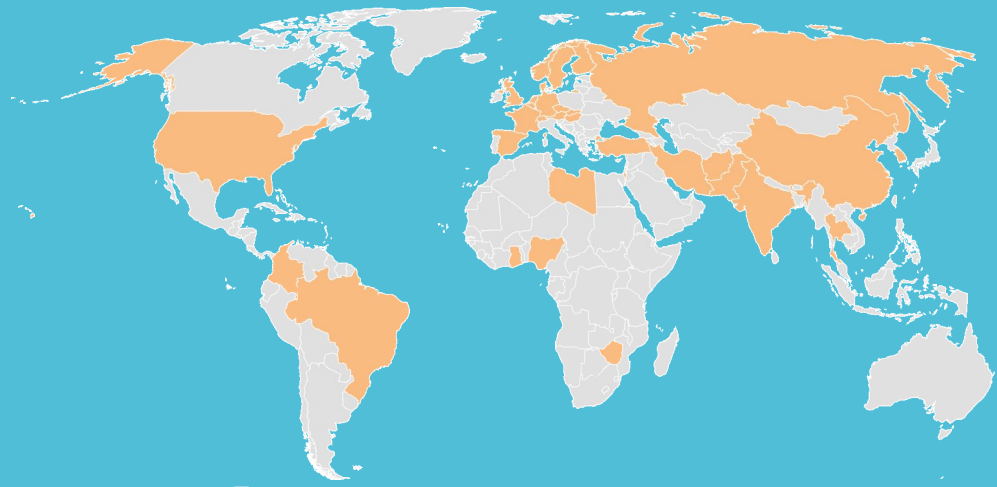

# 330 people from 39 countries and 190 companies are registered

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# October 15th

# HUGO BOSS AG

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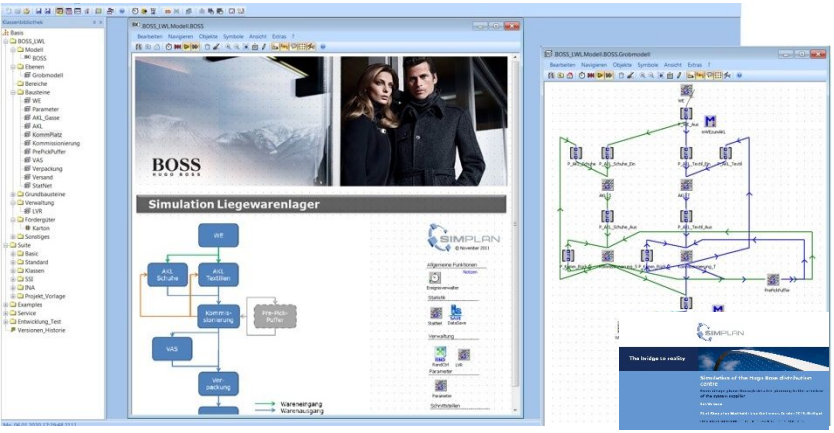
HUGO BOSS

- HUGO BOSS AG
- André Wiesner
- André Wiesner works for Hugo Boss since 2006 in the Global Logistics Strategy & Planning department. He is the intralogistics project manager for the new central distribution center for flat packed goods.

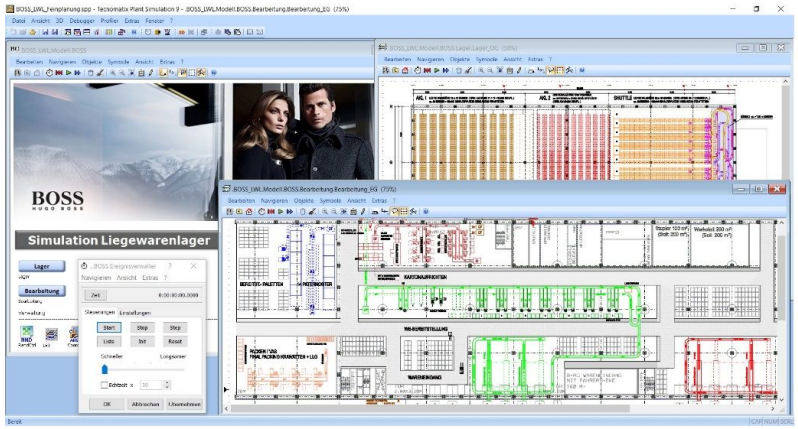
We will be visiting one of the world largest shuttle warehouses in consumer goods industry. The warehouse was simulated in Tecnomatix Plant Simulation.

**The tour to HUGO BOSS AG is already fully booked.**

# SimPlan AG presents at Hugo Boss




- SimPlan AG
- Dirk Wortmann
- Dirk Wortmann, born in 1967, finished his studies in computer science at the GKS Bad Homburg in 1988. He started his professional career in a Frankfurt engineering office and was involved in the development of simulation software and the implementation of simulation projects in the field of production and logistics. In 1992 he founded the company SimPlan together with his partner Sven Spieckermann. From the founding until 2013 he had been a member of the board. From 2010 to 2018, he set up and developed SimPlan's Chinese subsidiary in Shanghai.

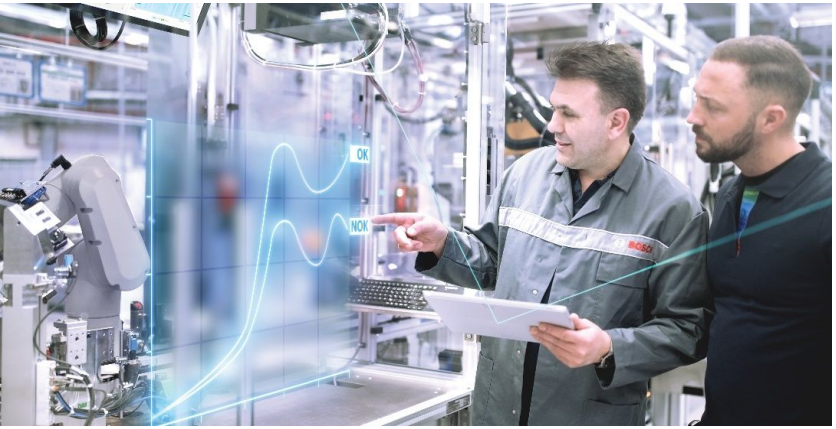



The simulation started with the determination of the required buffer sizes and the conveyor technology in the design phase of the new distribution center of HUGO BOSS AG. This was followed by the support of the detailed planning. The detailed model included the various warehouse areas, incoming goods, order picking, packaging, value added services and shipping.

The offers of the individual system providers were checked and compared on the basis of the simulation in order to examine the functionality and feasibility of the offered system even before the contract was signed.

# Robert Bosch GmbH Feuerbach: Automotive Supplier; Common-rail high-pressure pump housing production

- **The tour to the Robert Bosch GmbH Feuerbach is already fully booked.**




We will be visiting Robert Bosch in Feuerbach and walk through their production line of exhaust gas sensors. We will learn about Industry 4.0 at Bosch Feuerbach, get a production insight into their online spindle monitoring and energy observation, and pay a visit to the hardening department. We also get to see the common-rail high-pressure pump CP4 housing production and the CP4 assembly.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# October 16th

# Opening and Welcome

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- Siemens Industry Software GmbH
- Matthias Heinicke

Opening and Welcome, Agenda and more.

# Plant Simulation Version 15, and Roadmap 16

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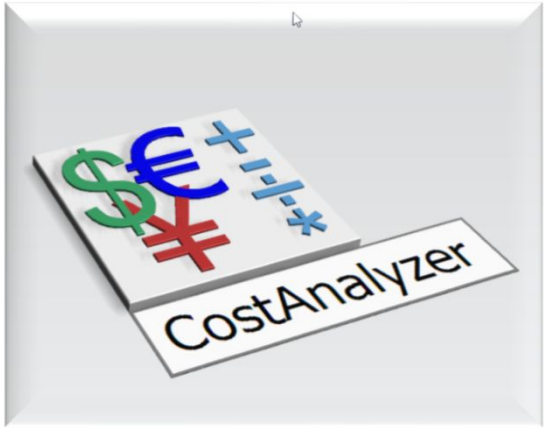
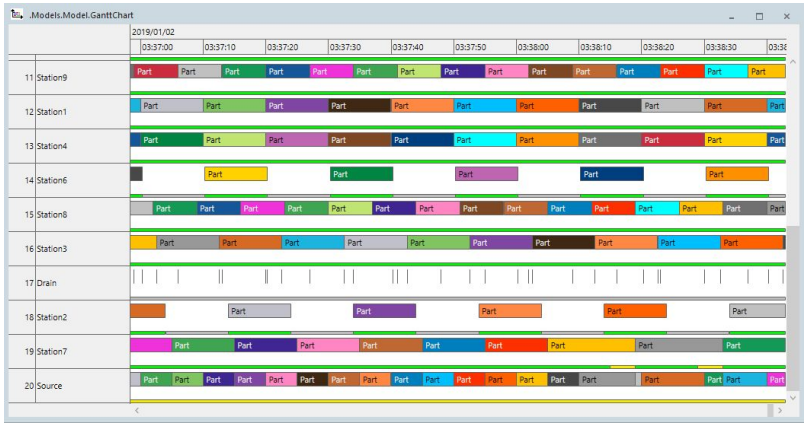



- Siemens Industry Software GmbH
- Dr. Georg Piepenbrock
- Product Manager Plant Simulation




AGV‘s driving freely, Cost Simulation; New Sankey Chart, New Gantt Chart, Automatic Conveyor routing; Enhanced Worker Strategies; Conditional Breakpoints; Teamcenter Wizard; 3D poses and much more

# Rolex SA usecase: Modelling manual assembly lines in the watchmaking industry

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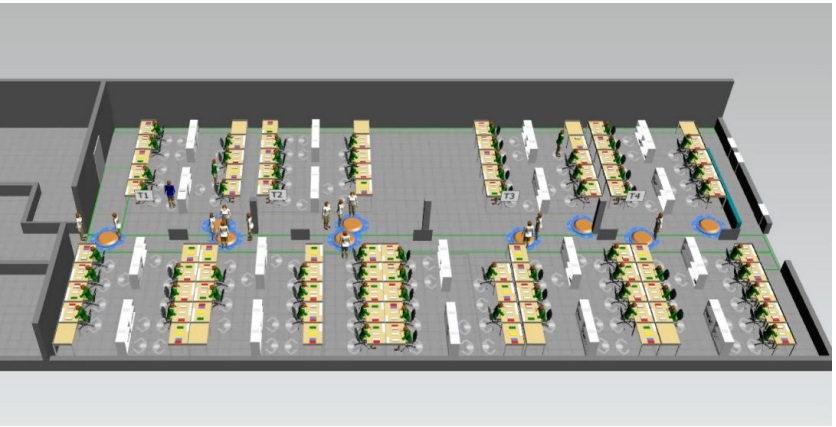
- Rolex SA
- Mr. Damiano Arena, PhD
- Damiano ARENA holds B.Sc. and M.Sc. diplomas in Management Engineering, majoring production, logistic, quality, management, and economic sciences. In 2015, he joined the Doctoral School of Advanced Manufacturing (EDAM) at the Swiss Federal Institutes of Technology in Lausanne, where he wrote his PhD thesis on semantics-based analysis of context-aware manufacturing systems. Between 2015 and 2019, Damiano has been leading Research & Innovation projects, designing and deploying cutting-edge solutions for the Factories of the Future (FoF). He recently joined *Rolex where he is responsible for leading optimization projects on logistic and production systems.*



Discrete events simulation tools, consumes, treats and generates data.

In a context of digitalization of the industry, it is more than ever necessary to effectively manage workflows. Therefore, in the first part, we will present our actual and target simulation workflow and associated tools. Afterwards, we will expose our main simulation subject, namely, manual assembly lines.

We will present obstacles encountered with the use of workers in Plant Simulation and the solutions we deployed to simulate realistic human behaviour. Finally, we will present a complete use case with our concept of workers as agents.

# Rolex SA usecase: Modelling manual assembly lines in the watchmaking industry


- Rolex SA
- Martin Rat
- Martin Rat is a mechanical engineer graduated from the Swiss Federal Institutes of Technology in Lausanne with a focus on Production and Management. Martin joined Rolex evolution process team in 2016. Since then, he carried multiple optimization projects with a focus on production lines with manuals activities.


Rolex SA usecase: Modelling manual assembly lines in the watchmaking industry

# Plant Simulation project for wagon building optimization at Ideal PLM in Russia

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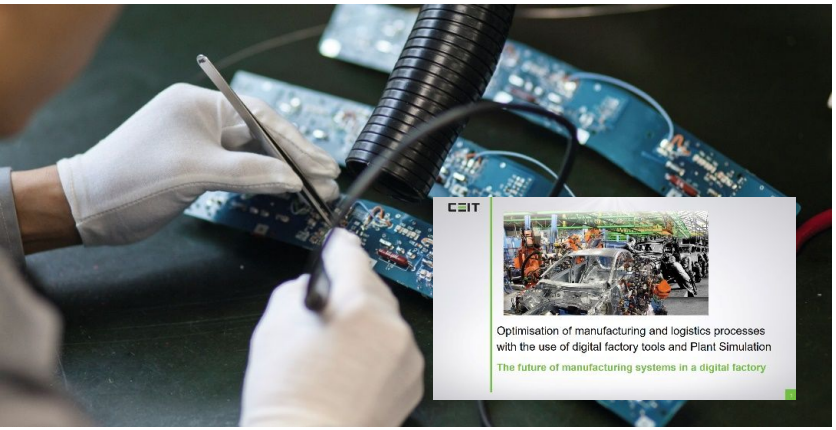
- Ideal PLM, Russia
- Anastasiya Pershina
- Anastasiia Pershina was born on Tomsk, Russia, and studied technology artistic processing of materials and product lifecycle management in Tomsk Polytechnic University and also was exchange student in University of Maribor, Slovenia. She is a PLM systems consultant in Ideal PLM CIS since 2018. Anastasiia works in the group of Industrial Consulting, makes pre-sale projects as consultant and Plant Simulation specialist.


A simulation model was developed for the operation of the painting shop for our project to optimize the conveyor line for painting wagons using Plant Simulation. The input parameters obtained from production were set and cyclograms were analyzed for the development of the model. The aim of the development of the model was to eliminate the bottleneck, which is this workshop, in the general cycle of manufacturing cars.

An important nuance of production is the quantity of different types of wagons (four types) that are handled at this shop, and the sequence of their supply is determined quite randomly. Thus, it becomes impossible to reduce the setup time. Another difficulty is the time of the painting operations, which cannot be reduced. Based on this and on the basis of a simulation model, organizational decisions were taken to optimize production and reduce downtime.

# Optimization of manufacturing and logistics processes with the use of digital factory tools and Plant Simulation





- CEIT, (Central European Institute of Technology, Žilina, Slovakia)
- Silvia Furtáková, Ladislav Papánek


- Silvia Furtáková, born in 1985, studied Industrial Engineering at Faculty of Mechanical Engineering at University of Žilina (Slovakia). In 2012 she finished her PhD studies with topic *Simulation metamodelling of manufacturing processes*. After that she worked as a researcher at Department of Industrial Engineering. Since 2017 she has been a member of team of specialists for digital technologies and is dealing with a computer simulation (in Plant Simulation) of manufacturing and logistics systems at Digital factory division at Central European Institute of Technology.


In manufacturing plants, there occur many organizational and procedural shortcomings that are, from the point of complexity of the system, difficult to be solved without the use of tools of digital factory. These support activities in designing of new manufacturing systems, in projection and optimization of production and logistics system layout, in detailed workplace designs, or in dynamic verification of designs and future changes of the system. Computer simulation is the last step in the phase of designing the system and verification of system changes. We use Plant Simulation in the areas of manufacturing, internal and external logistics, warehouse management, and production planning and scheduling. Such a set of digital tools completed with implementation of technical solutions and online monitoring is the basis for complex solutions for smart factories and for andvanced manufacturing systems in the spirit of Industry 4.0.

# Plant Simulation Use Case at EMAG - 3D Material Flow Simulation in the Metal Manufacturing Industry

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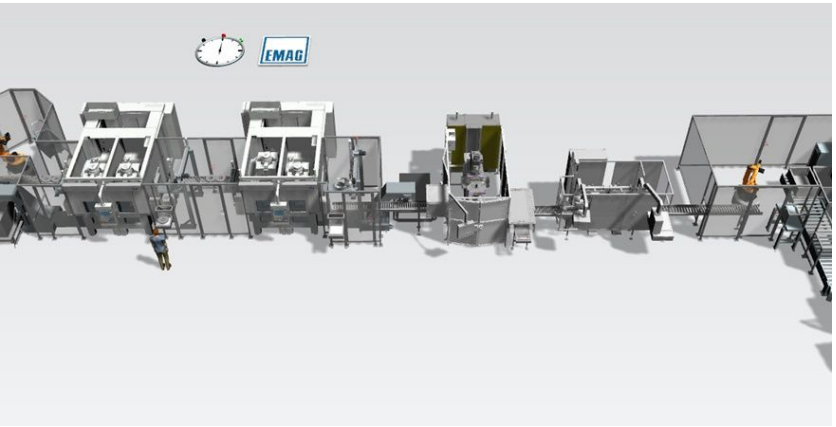
- EMAG GmbH & Co. KG
- Zhaocheng Xu
- Zhaocheng Xu, born in 1989, studied international production engineering and management at the University of Erlangen-Nürnberg. In 2018, he joined EMAG group as a virtual manufacturing engineer, and since then he is responsible for the visualization and evaluation of manufacturing concepts and the standardization of simulation projects using Plant Simulation.




## Summary:

Today's manufacturing industry is coping with an increasing variety and complexity. Material flow simulation offers significant benefits to manage this complexity and thus reduces operation costs. The acquiring of detailed simulation input parameters and the evaluation of performance results of manufacturing systems are time-consuming processes. In this circumstance, a simulation kit was developed at the company EMAG to standardize the input and statistic output of simulations.

This presentation will show you how Plant Simulation is used at EMAG to visualize and analyze the manufacturing line in the metal processing industry. It covers the 3D-Animation of moveable components and the evaluation of production line performance (e.g. the calculation of OEE) using an internal developed simulation tool kit.

# Control the material flow sequence in Plant Simulation according a schedule generated in Preactor

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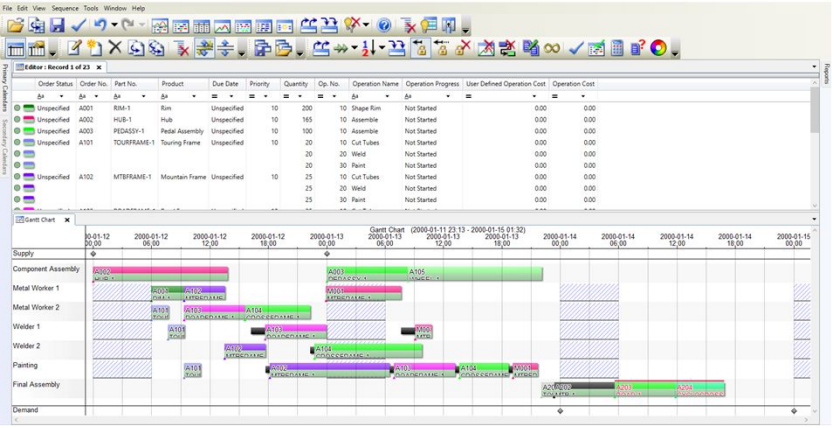
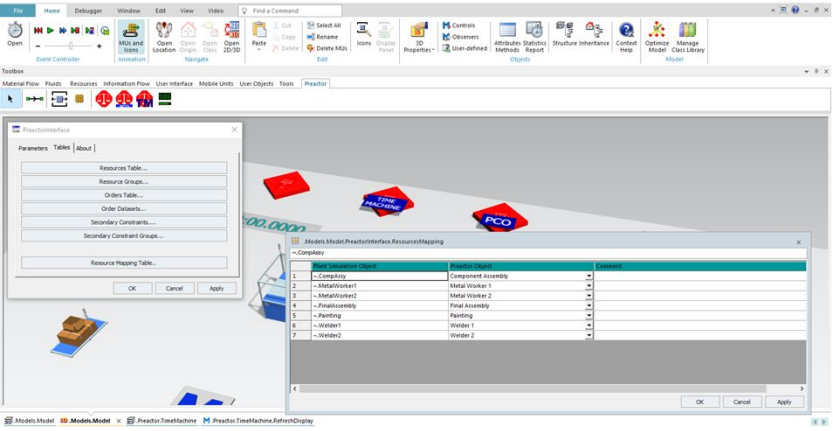


- Audi Hungaria Zrt. & GraphIT
- Marc Philip Hermans
- Marc Hermans is born in Maaseik, Belgium. He studied at the maritime academy Antwerp. He has a master degree in Nautical Science. In 2004 he started working at the AUDI Hungaria planning department as a junior planning engineer. In 2008 he joined the digital fraction within the planning department. Since then, he drives all material flow studies conducted with Plant Simulation within the engine department, not only for Audi Hungaria, but also for Audi AG.



In leaving conventional conveyor systems and switching to the use of automated guided vehicles, AUDI faced unknown territory. With first simulations with relative freely moving AGVs, it became clear that conventional push, pull and conwip controls, where insufficient. In conventional systems, the production sequence and daily production program can be seen as each other's mirrors. Turbulences in the sequence is relatively restricted and only occurs at defined weak spots in the production flow. This behavior makes it quite easy to control and manage the sequence over a relatively small amount of control points. Due to the use of AGVs, it becomes quite simple to reuse resources within the production flow, but this simplicity comes with a high price. With this study using Preactor and Plant Simulation, we want to give you an idea on the complexity of the problem and a good solution to keep the sequence in a production flow upright. After giving some insight into the problems encountered, we will show you how we used the ODBC Interface to pass vital information between Preactor and Plant Simulation. In a final part we will show you how we used the scheduling information from Preactor calculated to reach higher granularity in our PULL controls between the different resources, restoring the production flow.

# Control the material flow sequence in Plant Simulation according a schedule generated in Preactor

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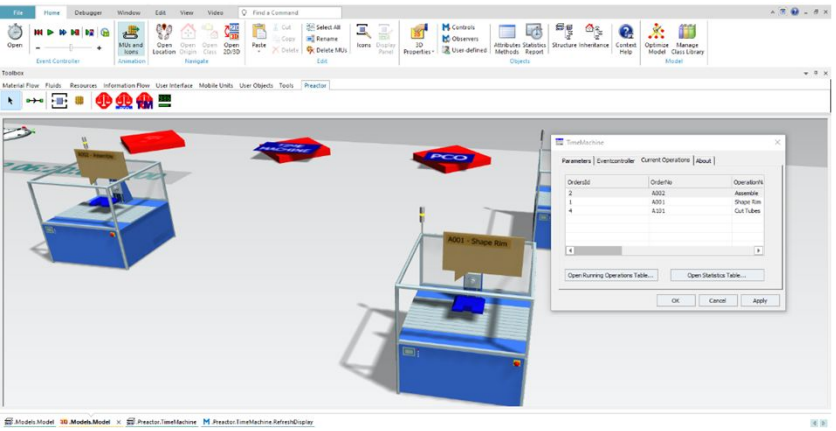
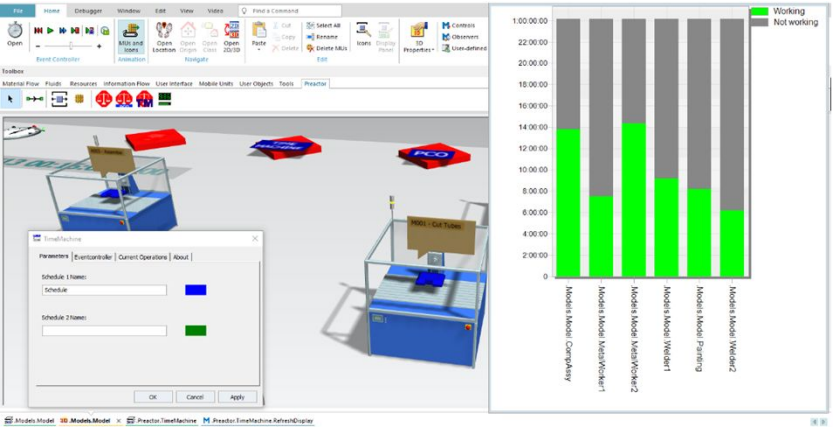


- GraphIT, Hungaria
- Zsolt Molnar
- Mr. Zsolt Molnar has an MSc degree in Mechanical Engineering from the Technical University of Budapest. He is also a professional business coach. Zsolt Molnar has been working in various positions at graphIT Kft. (the Hungarian Smart Expert Siemens partner) for the past 20 years.




Zsolt Molnar is a senior engineer in different fields of digital manufacturing, manufacturing simulation and production planning and scheduling. He has been working on countless projects in several industries, like automotive, electronics, food and beverage and others to improve manufacturing processes and help companies to enable a digital factory vision. He strongly believes that the future of manufacturing is in the digital twin concept, which focuses on the continuous and parallel improvement of the two parts of the digital twin – the real and the digital factory.

# Plant Simulation VR, virtual reality factory visualization, collaboration and control with HTC Vive and Co.

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- more3D GmbH & Co. KG
- Eduard Kinas, CEO
- Eduard Kinas, born in 1974, has nearly 15 years of experience with VR. He joined the first steps of VR and took an important part in the evolution of VR hardware, when he started working for more3D in it´s first steps on the market. In addition to that, he supervised the development of VR software, now days as managing director of more 3D. MoreViz is one of the notable results of his work with more 3D.

more3D presents on the 2019 Plant Simulation User Conference the pioneering moreViz software. After a short outline of the history of virtual reality (VR) a detailed picture of the profit of VR in connection with Plant Simulation will be drawn. An interactive demonstration of the VR bridge moreViz is the complement of the presentation.

# Digitalisation journey: How Electrolux is using Plant Simulation to develop smarter manufacturing facilities and what's next

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- Electrolux Home Products
- Ivan Braga
- Ivan Braga holds an Industrial Engineer degree from the "Universiade Federal de Minas Gerais", Brazil. He started working with discrete event simulation in 2015 on a project with Jaguar Land Rover, while studying at the Warwick Manufacturing Group, UK. He has joined Electrolux in 2018 as Plant Simulation Specialist, and since then has been the global responsible for developing material flow simulations for green and brownfield manufacturing projects.

Electrolux has invested considerable effort into a Digital Manufacturing transformation over the past years, and discrete event simulation has been one of the key initiatives under that scope. This presentation aims at sharing how Electrolux has successfully deployed Plant Simulation as a tool for prototyping, communication, and optimization, especially for large greenfield manufacturing projects. In addition to that, while Plant Simulation becomes a consolidated internal tool for optimization, questions are raised on how to keep growing simulation projects and deliver more value to the group.

# Simulation of a Large-Scale Storage System for Laser Cutting Machinery

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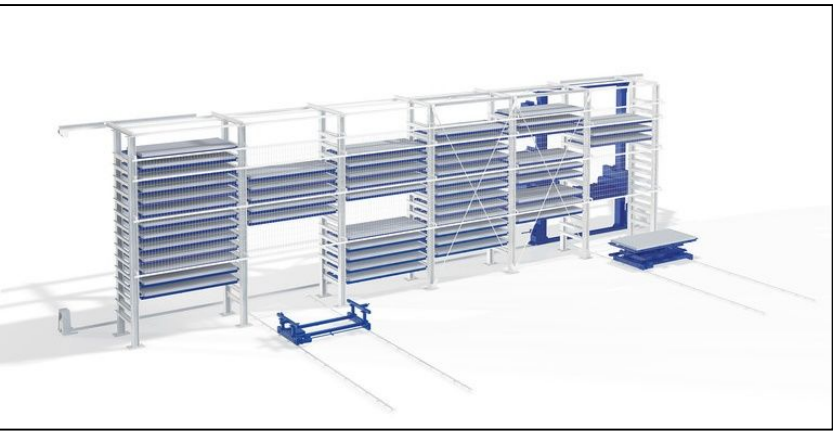

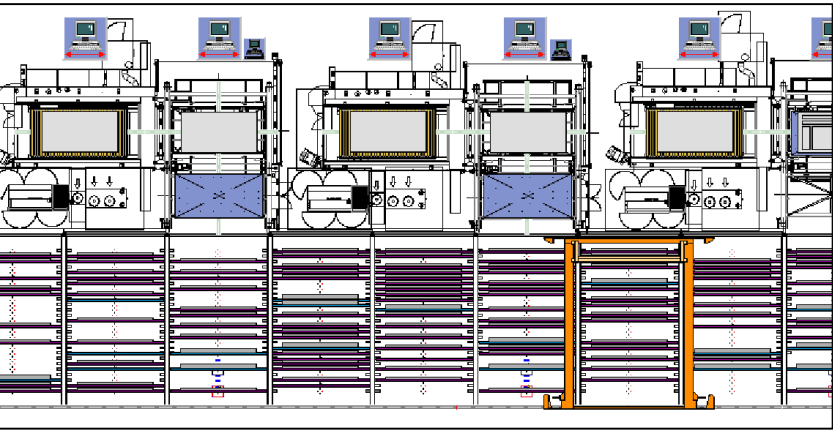

- Randon Implementos, Brazil
- Tiago Vacaro
- Tiago Vacaro has a bachelor degree in Industrial Engineering and a master degree in Mechanical Engineering, focused on operational research and process optimization. His simulation career started in 2012, working as a Simulation Engineer at Eisenmann, mainly with paint shop and logistics projects. Since 2018 he is responsible for the simulation projects at the Brazilian firm Randon Implementos, developing models for the different manufacturing units of the company.

To increase productivity and reduce production costs, Randon Implementos decided to acquire a large-scale storage system for laser cutting machinery. The system integrates five laser cutting machines with an automated vertical warehouse. The simulation took place on the planning phase of the project, to define elements as the number of conveyors and pallets. Other goals of the study were the evaluation of different scenarios of production strategy, as well the efficiency of the machines.

# Digital twin of a body shop containing robots and human workers in Plant Simulation at Magna Steyr Fahrzeugtechnik (MSF)

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- steffen bangsow advanced simulation services
- Steffen Bangsow

Steffen Bangsow has been working with material flow simulation since 1999. He already used previous versions of Plant Simulation, such as Simple++ and eM-Plant. Since 2002 Mr. Bangsow has been in the business of factory planning e.g. for automated production lines. In addition, he is the author of several books on Plant Simulation in German and in English. Mr. Bangsow works as an independent contractor for discrete event simulation projects as well as an instructor. He is teaching Plant Simulation basic, advanced and customized training classes. In his role as Plant Simulation mentor, he officially received the title of Plant Simulation black belt, leading the list of Plant Simulation related blogs with over 1000 Kudos in the Plant Simulation forum.

As part of investment projects, MSF identified the need for in-depth simulation support in body shops. Although the system suppliers provided models, in direct comparison with data from the current plant it turned out, that they were completely useless for most questions during the operation. The main reason was the low detailing of the models. Because of this MSF decided to develop new in-depth models for the body shops. In order to meet the requirements of the production department, the new models had to be much more detailed. Basic elements of the models are now e.g. all robots and workers with their individual process steps (at the same level of detail as the cycle time diagrams). In addition, all conveyor elements must be included, which have a direct link to the robot programs and are controlled by them. Parallel to the modeling process, MSF started to develop "BIG DATA methods" to automatically acquire and provide important data from the real plant to the model (e.g. failure data and robot sub-process data). The presentation will show motivation, basic approaches and benefits from more than three years work with the digital twins.

# A Hands-on Approach for Educating Engineers with Plant Simulation

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- Oakland University
- Robert Van Til, Ph.D., Chair & Pawley Professor of Lean Studies; Industrial & Systems Engineering Dept.
- Robert Van Til is the Pawley Professor of Lean Studies and Chair of Oakland University's Industrial and Systems Engineering Department in Rochester, Michigan, USA. His educational and research interests focus on manufacturing systems, lean and PLM. His projects have been supported by the National Science Foundation as well as by companies such as Fiat Chrysler Automobiles, Ford Motor Co. and Siemens PLM Inc. He has served in visiting positions at universities in Hawaii, the Netherlands and Australia.

Oakland University's Industrial and Systems Engineering Department is an academic partner of Siemens PLM, integrating several Tecnomatix tools, Teamcenter, SIMATIC IT and MindSphere into its curriculum. This presentation shows how Plant Simulation is used to provide Industry 4.0 education to students as well as to working engineers engaged in lifelong learning. Plant Simulation has been integrated into several courses, enhancing the educational experience by providing industry-relevant assignments. For students wanting to take a deeper-dive into Plant Simulation, the department has created a new course: PLM Applications - Throughput Simulation. It provides a combination of training/education by teaching Plant Simulation and using it to complete various assignments.

# Plant Simulation in the Glass manufacturing industry and integration of XHQ, improving enterprise performance through operations intelligence solutions

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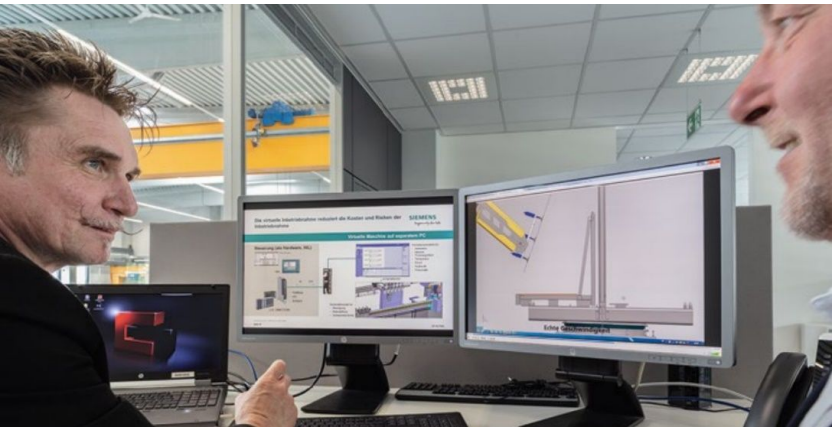
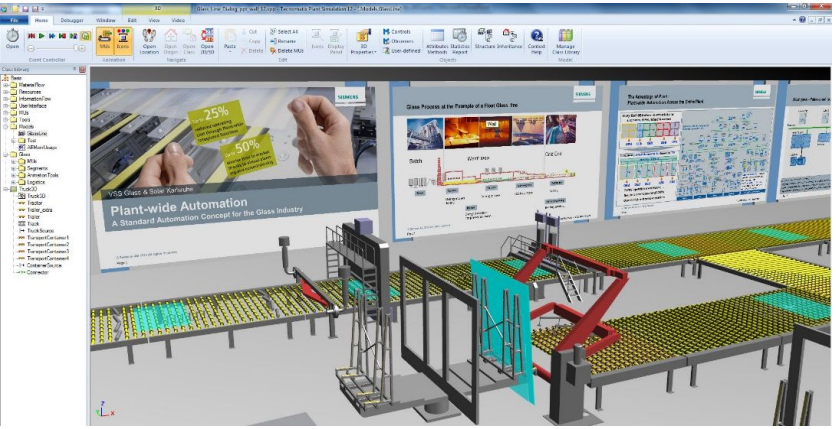


- Siemens AG, Germany
- Heinz-Josef Lennartz,
  Magdi El-Awdan, Bernd Lehmann
- Mr. Lennartz was born 1962. After school he served 13 years in the German Airforce and finished college 1997. From this time, he works for Siemens in the Glass industry. Today he is responsible for the countries China, Brazil and USA in Head Quarter Glass Karlsruhe and in addition Global Account Manager for the Company Fuyao.




The presentation shows how to use Tecnomatix Plant Simulation in combination with cloud based XHQ models, to tell the whole project story.

The real 3D data is taken from OEMs to realize the Tecnomatix Plant Simulation models. The XHQ model has a connection via interface. A perfect synthesis between automation- and virtual world.

# Internet of Things:
# Connecting MindSphere with Plant Simulation

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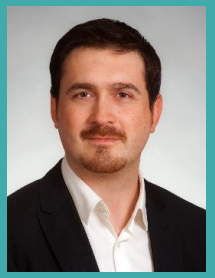
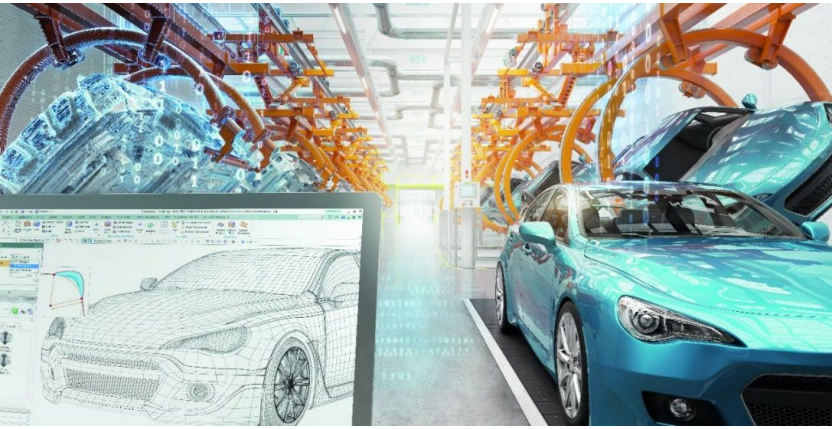
- inpro, Germany
- Dr.-Ing. Ender Yemenicioglu
- *Ender Yemenicioglu, born in 1982, studied mechatronics at the Otto-von-Guericke University Magdeburg and earned his doctoral degree with the topic "Data exchange for physics-based simulation of material handling systems in digital factory" in 2017. He works for* inpro Innovationsgesellschaft für fortgeschrittene Produktionssysteme in der Fahrzeugindustrie mbH *since 2017 and engaged in software development projects in digital factory field since 2011. He has expertise in data management and data exchange between engineering planning tools, especially with the AutomationML format. His current task involves developing an industrial cloud application with MindSphere to transfer shop floor data into Plant Simulation, together with the project partners Volkswagen and Siemens.*





Today, discrete event simulation models are mostly generated manually and parametrized with preconsolidated and experience-based data. Therefore, model accuracy is well suited for validation use cases during the planning phase, but not for simulation use cases during the operation phase.

It is therefore necessary to improve the accuracy of discrete event simulation models, while at the same time reducing data collection cost. The talk will highlight possibilities of using MindSphere for this purpose.

# Simulation of Vessel Traffic in Ports using Plant Simulation

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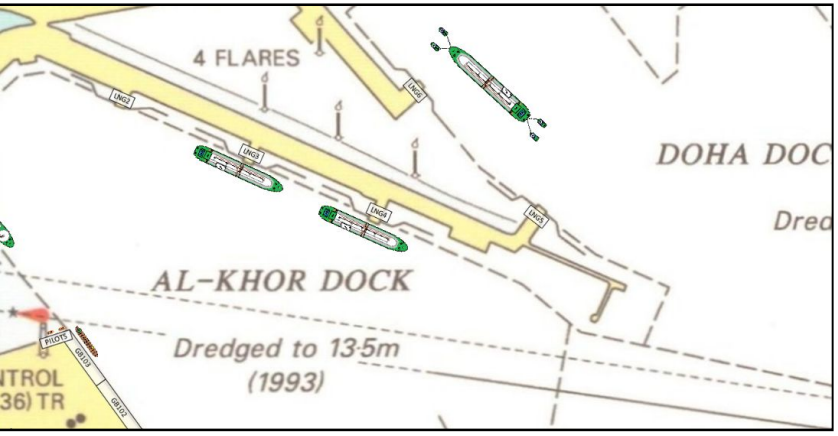


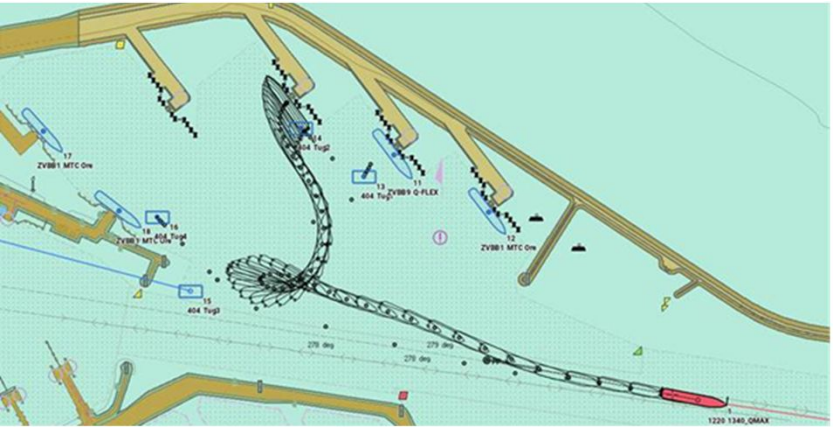

- HPC Hamburg Port Consulting GmbH
- Carsten Eckert
- Carsten Eckert holds a diploma in naval architecture and ocean engineering and has started his career in simulation at Flensburger Shipyard where he worked on the development of simulation models for cargo handling operations on RoRo terminals. He joined HPC in 2015 and is now responsible for the ongoing development of HPC's in-house simulation toolbox *HPCsim*. During recent years, Carsten has worked on numerous simulation projects for clients all over the world dealing with all kinds of marine and intermodal terminals.

Ports are the backbone of international logistics. Insufficient port resources, such as tugboats, pilots and berths, but also spatial limits of the port's approach channel regularly lead to unwanted waiting times for vessels. Simulation can be used to analyze the vessel traffic in ports and to assess improvement options. Next to equipment numbers (tugs, pilots…) also the impact of adaptations of port traffic regulations and deepening of waterways can be evaluated.

Based on HPC's existing simulation toolbox, HPCsim, a marine traffic simulation module has been developed. All kinds of ports, different vessel types and complex port regulations can be modelled. The toolbox also includes weather and tidal conditions.

In the presentation, the underlying concepts and challenges during use of the simulation models as well as representative results of some of HPC's previous projects will be presented.

# Testing real Warehouse Management Software (WMS) with Plant Simulation using the OPC Interface. Use case for Pesmel, Finland and cards PLM Solutions Warehousing and Logistics Library

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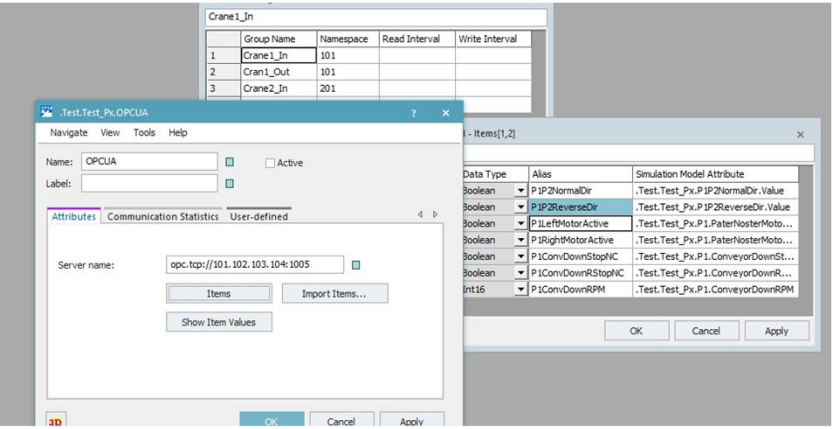
- cards PLM Solutions B.V.
- Auke Nieuwenhuis

Auke has over 12 years of experience in the field of digital manufacturing. During his career he gained firm experience in the field of CPG, automotive and process industry. After completing his master's in industrial engineering, Auke started as junior Plant Simulation Consultant at cards PLM Software. Over the years he has gained massive experience in Discrete Event Simulation / Process Simulation. Within his role as Business Development Consultant, Auke is advising his customers in the discrete and continuous industry by designing, validating and optimizing material handling systems, assembly, warehousing, automation and virtual commissioning.




Testing and optimizing of operations systems such as Warehouse Management Systems (WMS) is a complex task. For a fully-integrated test, all hardware must be in operation. With big systems such as Automated Storage and Retrieval systems (ASRS), this is a time-consuming job, it makes the whole commissioning time complex and long.

By connecting a simulation model to the development of the WMS system, hardware and software development of different layers in the operation can be done simultaneously. Time for real life testing will be reduced dramatically and issues are found in an early stage when the software is tested on the virtual twin of the ASRS operation.

# Simulating Automobile Seaport Terminals - Challenges and Potentials

SIEMENS
Ingenuity for life


- BLG Logistics Group AG & Co. KG
- Michael Goerges
- Michael Görges, studied industrial engineering with a specialization in logistics at university of Bremen. In 2013 he joined BLG LOGISTICS GROUP AG & Co. KG. where he works as R&D project manager focusing on data analysis and simulation topics. In this context, he develops solutions in the fields of offshore wind logistics, seaports and general logistics. Moreover he led the standardization working group "logistics" which developed the ISO 29404 as a subcommittee of DIN Standards Committee Shipbuilding and Marine Technology. Currently, Michael Görges leads the collaborative research project "Isabella", which is funded by Federal Ministry of Transport and Digital Infrastructure.

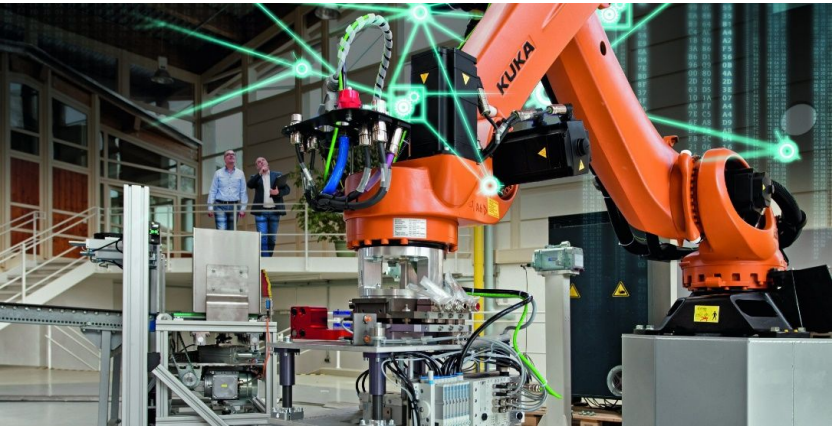
Logistic processes in sea and inland ports play an important role for finished vehicle logistics. Highly flexible and efficient processes are required to cope with short-term change demands. Due to these volatile conditions, planning logistics processes for an automobile seaport terminal is a challenging task on different time scales (i.e. short-term, mid-term and long-term). In this context, the collaborative research project "Isabella," which is funded by Federal Ministry of Transport and Digital Infrastructure, addresses these challenges by combining a multi-touch table environment with logistics simulations.

# Optimize performance measures in semi-automated human centered assembly cells, using CAD data developed in NX Line Designer and Tecnomatix Process Simulate

SIEMENS
Ingenuity for life


- University of Southern Denmark
- Ali Ahmad Malik
- Mads Clausen Institute


- Ali holds a diploma in mechanical engineering, a bachelor in industrial engineering and a master in innovation and business with a focus on production technology. Ali started his career as a design engineer in gearbox manufacturing company in Pakistan and later joined Danish company Danfoss. Ali joined LINAK, Denmark, in 2017 and is part of the technology development team working on human-centered flexible assembly systems. Ali is writing his Ph.D. thesis at the Mads Clausen Institute of the University of Southern Denmark. In his research work he is working with collaborative robots and is developing simulation models for performance evaluation of human-robot collaborative assembly cells.

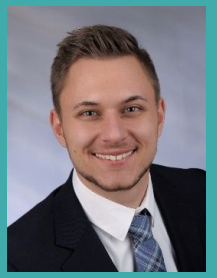



The dream combination of humans and machines working together is now being realized through collaborative robots or cobots. The right amount of automation can be attained through a balanced interaction of humans and robots where each is doing what it is best at. Nevertheless the current application of cobots in dexterous assembly work is limited. The challenges are the need of reconfigurability and adaptability to production changes. This study explores human-robot collaborative assembly systems for reconfigurability through modularization. Modular assembly cells are developed with collaborative robots, flexible feeding systems and various form of human-robot interactions leading to productivity variations. The design data is developed using Siemens NX, and Process Simulate is used for process verification and cycle time calculations. The need of having a stochastic simulation model becomes necessary to optimize various possible assembly cell configurations, productivity analysis, and bottlenecks depiction. The varying robot speeds due to variation in the interaction levels with humans are evaluated through the simulation model.

# Connecting AmeSim to virtually assess and optimize the performance of mechatronic systems with Plant Simulation

SIEMENS
Ingenuity for life

- Siemens AG
- Mr. Sebastian Schuesslbauer
- Sebastian Schüßlbauer (M.Sc.) studied Applied Research in Engineering Sciences at the Technical University of Applied Sciences in Nürnberg. He was continuously involved in different simulation topics and tools during his academic education. In 2017 he joined Siemens AG Factory Automation and he is now part of the team for the solution management for virtual commissioning with the Siemens software portfolio. His focus is on the connection of simulation model, mainly Plant Simulation, and automation code for validation of the logic before deployment for the purpose of virtual commissioning. Additionally he is also involved in innovation topics in regards of digitalization for industry.

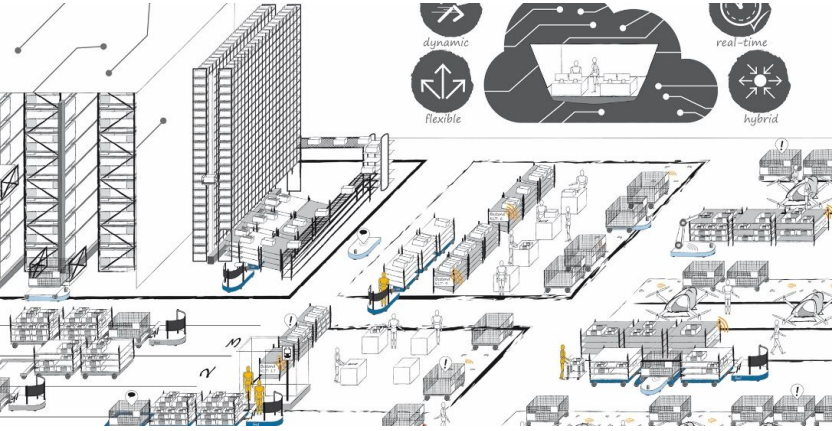


The chemical & process industry is driven by the market needs of commercial and domestic consumers. Equipment manufacturers need to be able to supply highly and reliable customized equipment that can keep up with the ever changing demands. Processes like mixing liquids and filling containers are typical in the Food and Beverage (F&B) branch but can also be found in chemical or pharma industries among others. In Tecnomatix Plant Simulation the simulation of the discrete and also the process part is possible in regards to the material flow. But if more detailed information about the processes are required, it is possible to couple a multi-physics simulation by Simcenter **Amesim** for a co-simulation. This enables the detailed sizing of the sub-systems and a better understanding of the production. The introduced setup is also used for the virtual commission by connecting PLCSIM Advanced to test the automation code before deployment. Plus the Simcenter Amesim model can be used as a digital shadow next to the real machine running on SIMATIC Edge in the SIMATIC LiveTwin app for additional value.

# Comparison of control algorithms for in-plant milk-run systems solving the vehicle routing problem

SIEMENS
Ingenuity for life

- Technical University of Munich (TUM)
- Christian Lieb
- Christian Lieb, studied mechanical engineering and management, majoring in control theory and logistics at the Technical University of Munich (TUM). In 2016, he joined the Chair of Materials Handling, Material Flow, Logistics (fml) at TUM as a researcher and teaching assistant. There he is responsible for the teaching of material flow simulation. His research focus is on the design and impact of dynamic production supply, which he is also doing his doctorate on.




The demand for flexible and dynamic production systems is continuously increasing. As a result, the requirements for internal production supply are also changing. In order to avoid bottlenecks even during peak loads, static supply concepts usually have to be oversized. Dynamic approaches, on the other hand, promise a stable and efficient system.

The internal transport in production supply can be divided into direct and collective transport. While direct transport, e. g. by means of forklifts, is already flexible, there are usually no suitable concepts for exploiting the advantages of collective transport in dynamic production systems.

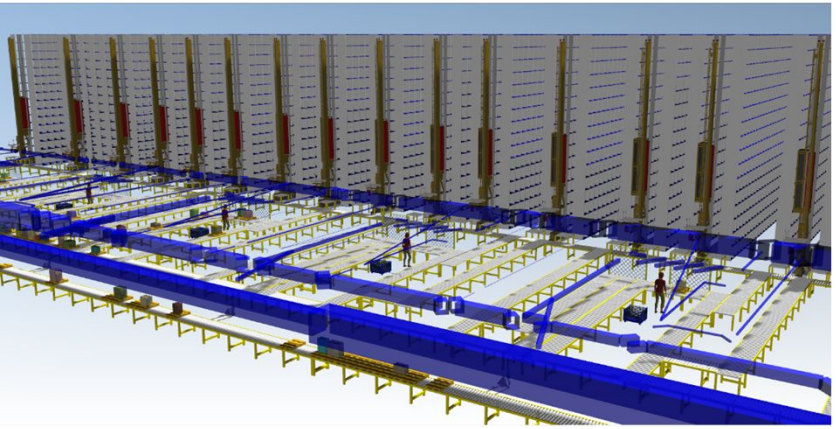
The presentation will show various such concepts. Solving the vehicle routing problem under practical constraints is fundamental for each. In addition, the implementation of the internal production supply in Plant Simulation as well as the evaluation of the control approaches are presented.


SIEMENS
Ingenuity for life
October 17th

# Large scale 3D Plant Simulation models used at SSI Schaefer in intralogistics - lessons learned

SIEMENS
Ingenuity for life

- SSI SCHÄFER
- Lars-Boris Böttcher
- Since 6 years Lars-Boris Böttcher is responsible for the simulation and data analysis department of the SSI Schäfer Automation Group. His team is conducting simulation studies for all market sectors worldwide, evaluating and optimizing concepts in the field of intralogistics . Before he worked another 6 years as consultant and technical sales manager in the field of simulation and emulation. During his studies of computer science he already focused on simulation, writing his master thesis about simulation of supply chains at Volkswagen AG in 2008.



Following a constant growth over the few last decades, simulation in intralogistics has experienced a surge within the last 3 years. This is due to an increasing size and complexity of systems and smarter solutions. Current discussions about AI and Digital Twin are amplifying this effect.

Observing the market, different tools are competing in 3D animation, offering high quality 3D visualizations. Therefore, SSI Schäfer was using 2D simulation in addition to 3D animations. This changed due to the improved 3D capabilities of Plant Simulation software. SSI Schäfer is constantly expanding its 3D modeling, meanwhile running the largest and most complex studies with >250,000 simultaneously moving items in 3D.

This talk is to share experiences, limitations, concepts, quick wins and motivations in large scale 3D models. It will show examples of large intralogistics simulation models naming run-times, pitfalls and lessons learned.

# Teamcenter Manufacturing – Plant Simulation
# Teamcenter Wizard and more

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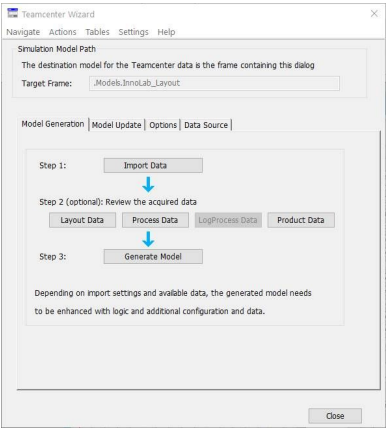
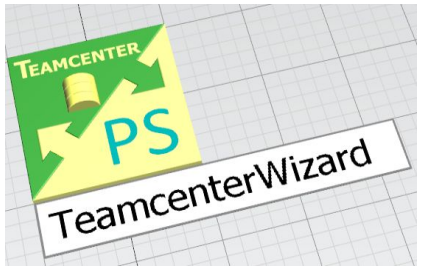
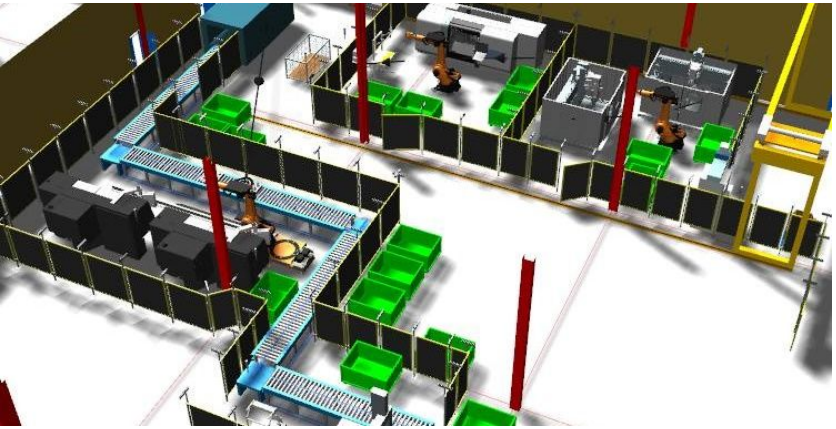



- Siemens Industry Software GmbH
- Ralph Bauknecht
- Ralph Bauknecht is a Technical Sales Consultant in presales department. He has been working at Siemens Digital Industries Software and its predecessors with Plant Simulation for more than 20 years.
- At the moment Mr. Bauknecht focuses on the Plant Simulation – Teamcenter – NX Line Designer collaboration with TeamcenterWizard.



Todays planning demands can only be met when the different parties work together in new ways. Data exists in single sources and needs to be reused efficiently by the multiple disciplines and tools.

Mr. Bauknecht will show in a live demo the reuse of Teamcenter and Line Designer data in Plant Simulation, using of the new TeamcenterWizard. The talk will also graze subjects like NX Line Designer, Teamcenter MPP, EasyPlan or Process Simulate.

# A short introduction to the Experiment Manager and its recent extensions

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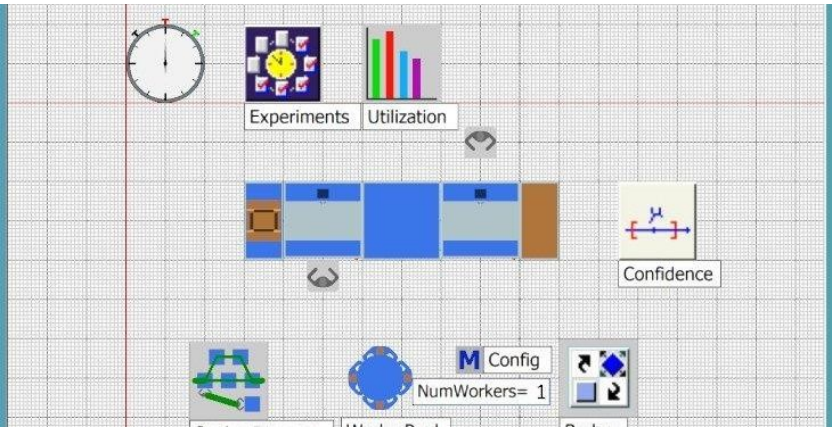


- Siemens Industry Software GmbH
- Dr. Peter-Michael Schmidt
- Dr. Peter-Michael Schmidt studied mathematics and physics at the University of Jena, Germany. He received his Ph.D. in mathematics at the University of Jena. Since 1995 he has been participated in the development of Tecnomatix Plant Simulation. His special interests are in statistics and optimization with Tecnomatix Plant Simulation.


For a small stochastic model, Peter Michael Schmidt will introduce the Experiment Manager. Numerical and graphical evaluations are briefly shown and explained. For examining the accuracy of the results and consequently its reliability confidence intervals are used, but the mathematical foundations are frequently unknown. Also discussed are questions as to whether parameters of different parameterizations differ significantly or whether the observed differences can only be explained by the stochastic nature of the model.

# PPI-Informatik: Plant Simulation scheduling use cases in the Consumer Packaged Goods Industry

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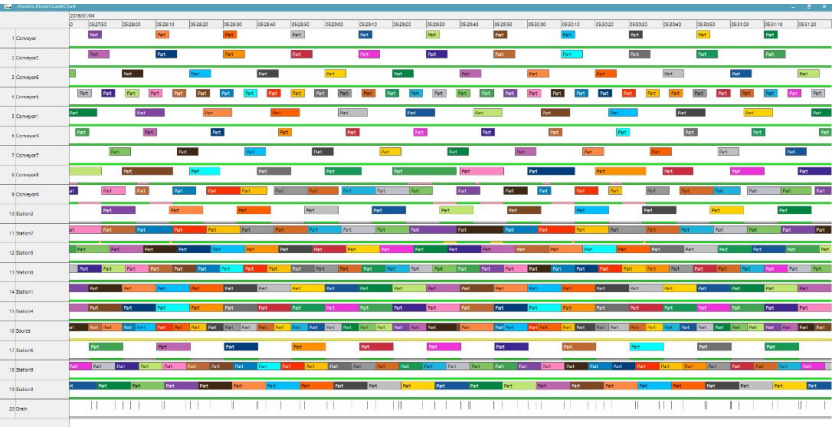

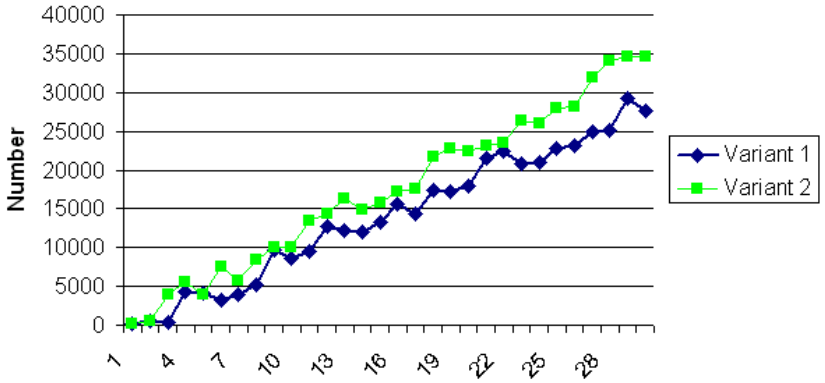


- PPI-Informatik
- Stefan Pfaff
- Stefan Pfaff studied Production Engineering in Aalen, where during an intern he had fist contact with SIMPLE++ , the predecessor of Plant Simulation.
- After 2 years at AESOP Consult, he co-founded PPI-Informatik together with 3 other colleagues in 1996. The focus of PPI is providing Simulation Consulting in production and logistics, where Stefan is involved in most of the projects related to production and optimization.

PPI recently was involved in many projects focusing on Production scheduling. These projects for different manufactures of different products share a common problem to be solved. How to schedule the sequence of the production orders in a way to maximize throughput, without violation of the complex constraints and rules that define a valid schedule for the specific operation. In most cases the constraints are linked to complex rules for resource allocation or to avoid downtimes by minimizing cleaning and set up operations which result from the sequence the orders are processed during manufacturing.

Typically these type of restrictions are difficult to handle for classical ERP based scheduling tools. PPI will show how simulation based Scheduling Tools based on a Plant Simulation process model and an Optimizer which is also build with Plant Simulation, works. Several use cases will illustrate the benefit of this Simulation based Scheduling approach and give an overview how to approach these type of projects.

# Routing of movable units: Finding the best route across conveyor networks, including workers carrying parts

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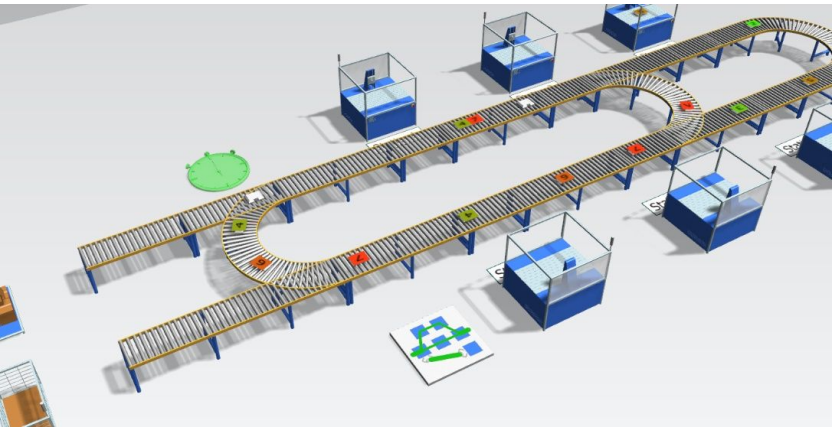
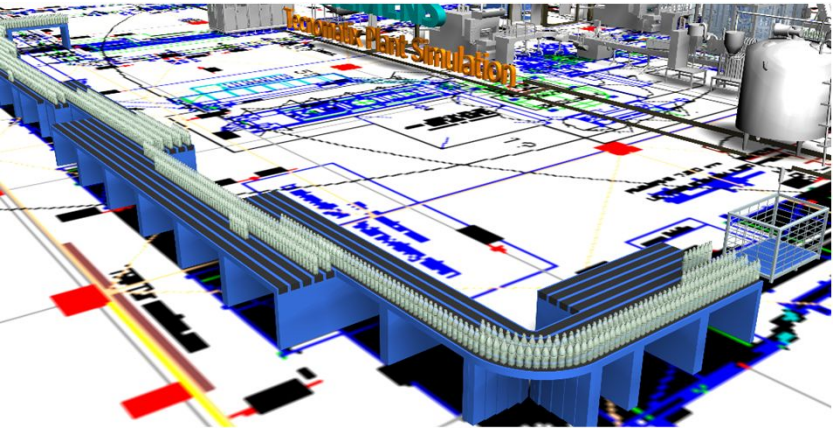


- Siemens Industry Software GmbH
- Michael Joos
- Michael Joos, born in 1971, studied computer science at the University of Stuttgart. He leads the Plant Simulation core development team at Siemens. Michael has been working on the development and maintenance of Plant Simulation for 21 years.




Michael Joos will present the new and improved automatic routing feature of parts which finds the optimal route across conveyor networks. This also includes workers carrying parts between stations.

# New freely driving AGVs, live demo

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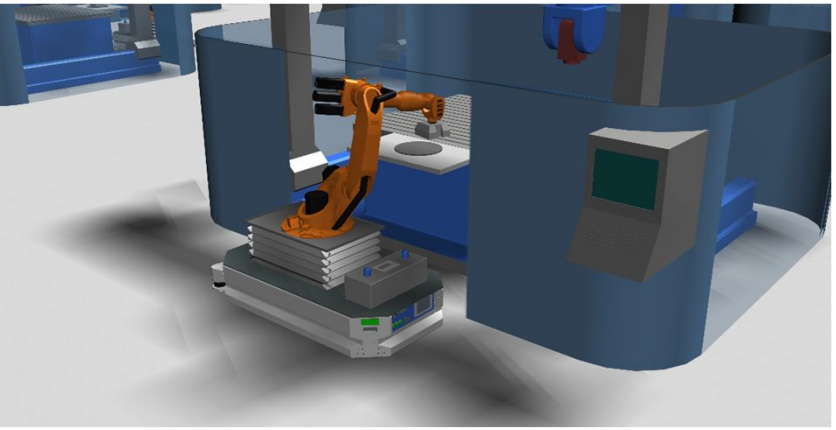
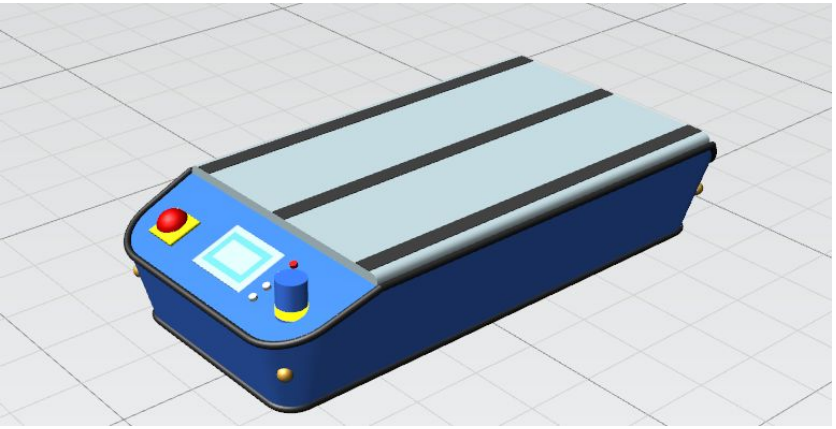


- Siemens Industry Software GmbH
- Ralf Tobel



Live demo of the new Automated Guided Vehicle System on which the AGVs are not bound to a permanently installed route network.

How to work with multiple AGVs, how to use directional and omnidirectional Markers, how to define the route of the AGVs, etc.

# Modeling of worker impacts in automated body shop lines (approach and findings)

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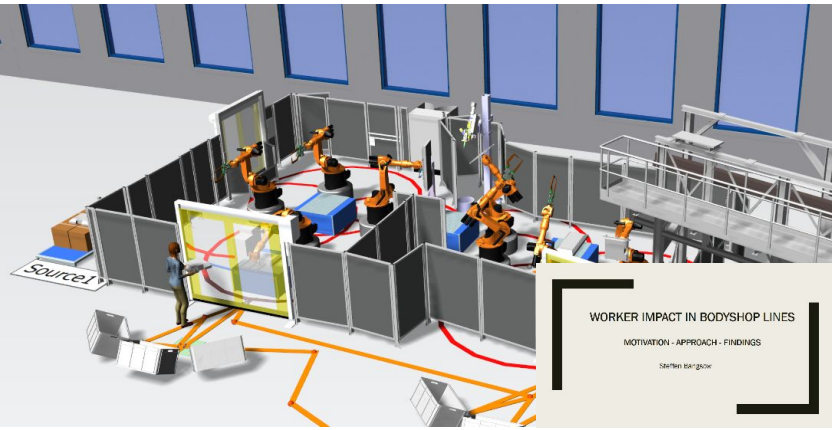
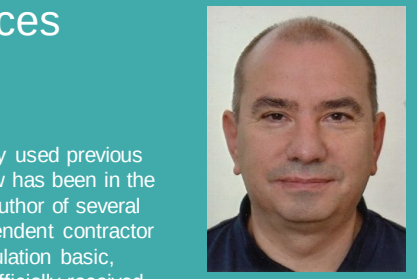
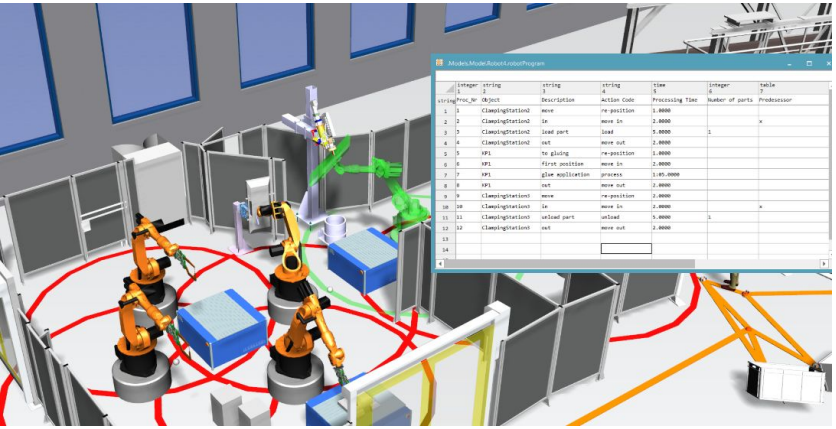



- steffen bangsow advanced simulation services
- Steffen Bangsow
- Steffen Bangsow has been working with material flow simulation since 1999. He already used previous versions of Plant Simulation, such as Simple++ and eM-Plant. Since 2002 Mr. Bangsow has been in the business of factory planning e.g. for automated production lines. In addition, he is the author of several books on Plant Simulation in German and in English. Mr. Bangsow works as an independent contractor for discrete event simulation projects as well as an instructor. He is teaching Plant Simulation basic, advanced and customized training classes. In his role as Plant Simulation mentor, he officially received the title of Plant Simulation black belt, leading the list of Plant Simulation related blogs with over 900 Kudos in the Plant Simulation forum. https://community.plm.automation.siemens.com/t5/Plant-Simulation-Forum/bd-p/Plant-Simulation-Tecnomatix





In order to model the impact of the workers on the throughput of a body shop line, both robots and workers have to be modeled in detail with their processes. The presentation shows several approaches to do this.

- modeling of assembly (welding, riveting, folding, screwing…) and handling robots
- modeling of robots on rails (7th axis)
- modeling of workers
- linking of robot and worker processes (e.g. modeling of worker gates)
- impacts of workers: e.g. missing the gate open-times, delays in case of failures, “bridging” of buffers

# Cost Simulation in Plant Simulation Version 15

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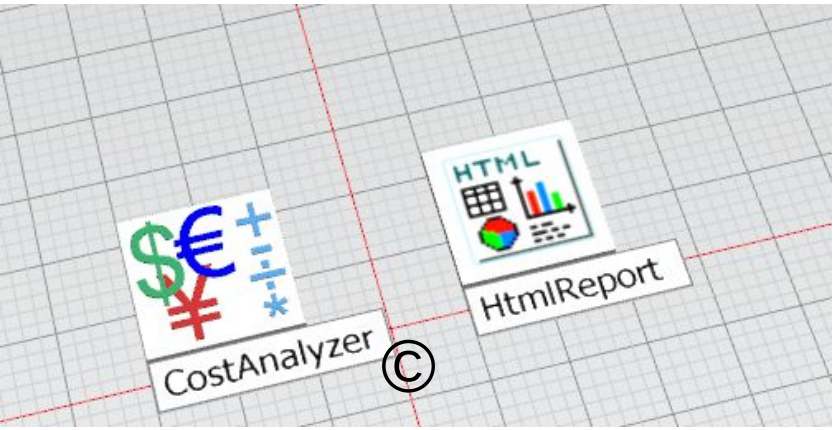



- Siemens Industry Software GmbH
- Timo Staudenmaier
- Timo Staudenmaier studied Physics at the University of Heidelberg. He used to be part of the Teamcenter Manufacturing development team. Today he works in the core development team of Plant Simulation and developed the Cost Analysis object.


*Cost Analysis* ©

| Object | Investment costs [€] | Depreciation period [years] | Operating costs [€/year] |
|---|---|---|---|
| Factory51 | 2440427.50 | | 407868.85 |
| └ P1 | 1025549.80 | | 170456.89 |
| └ Line | 4180.29 | 15.00 | 1420.04 |

Investment costs

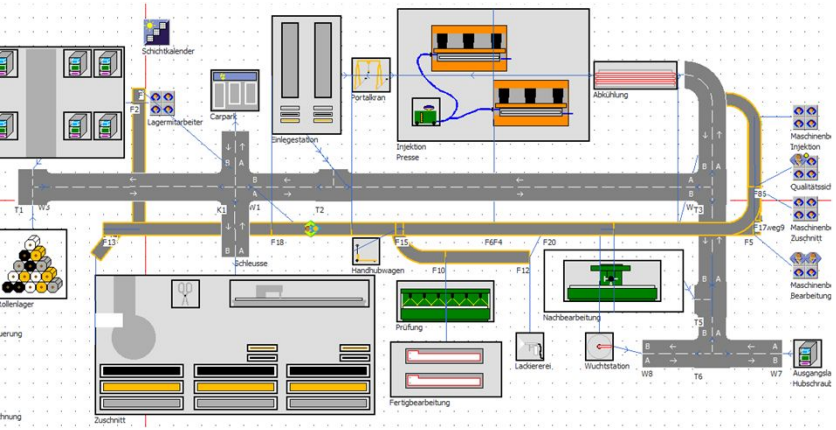
| MU Type | Piece costs [€] | Material costs [€] | Accrued costs [€] | General costs [€] | Throughput | Work in process |
|---|---|---|---|---|---|---|
| Aubergine | 3.09 | 3.00 | 0.03 | 0.05 | 1715 | 332 |
| Strawberry | 3.09 | 3.00 | 0.03 | 0.06 | 1506 | 541 |

Piece costs

In Plant Simulation version 15 we introduced the Cost Analysis feature. We will present the functionality of the new object. We explain how to use the object together with the HTML Report, how the accrued costs are distributed to the moving parts during a simulation run, how those costs are accumulated at the part types, and how to query the analysis result. The introduction includes access to the object by SimTalk methods.

# Economical evaluation of CFRP-process chains using Plant Simulation

SIEMENS
Ingenuity for life

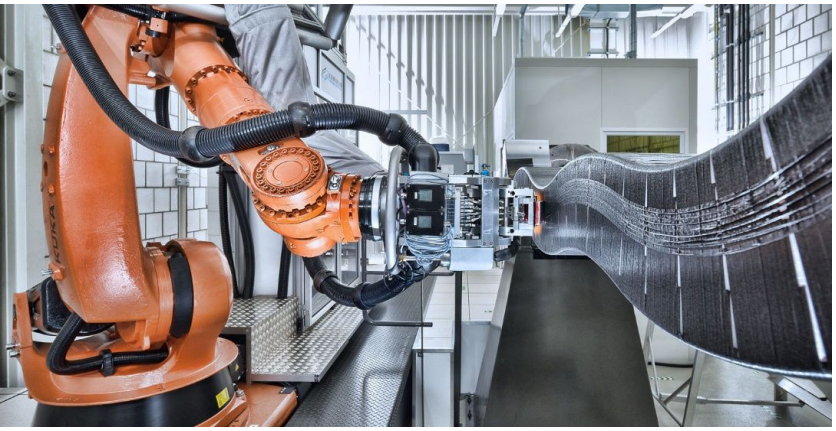



- Fraunhofer IGCV
- Thomas Neuhaeuser
- Thomas Neuhaeuser, studied industrial engineering and management at the Technical University of Kaiserslautern. As Christine Probst, he is working as a researcher and consultant in the department of Factory Planning and Evaluation. His research focus is in the field of data analytics in the production environment and factory layout optimization with Building Information Modeling, where he is also writing his doctoral thesis.

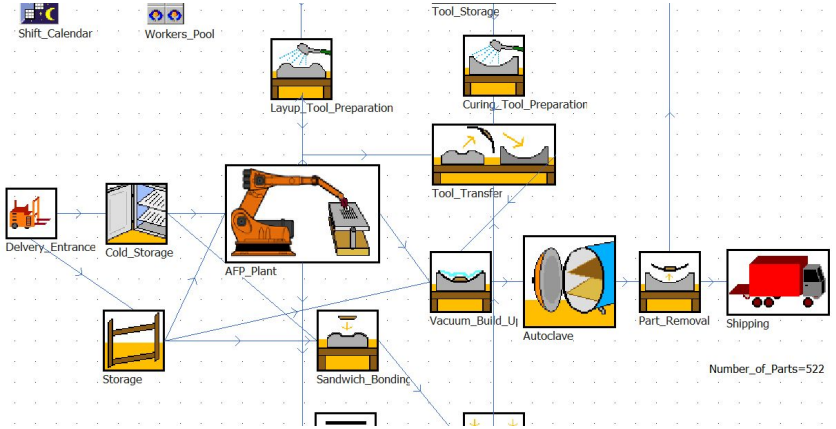

In the department of *Factory Planning and Evaluation* at *Fraunhofer IGCV*, *Plant Simulation* is one of the basic tools to visualize, analyze and optimize value streams. The individual configurability allows our factory planners to develop new libraries of process modules, add-ons to calculate certain key performance indicators and visualizations for industrial partners. Due to the deep knowledge of CFRP-processes, the researchers of the *Fraunhofer IGCV* build highly sophisticated CFRP-process modules, which lead to realistic CFRP-value chains, what-if scenarios and performance evaluations within minutes. This knowledge is not only used in the CFRP-industry, the simulative verification is a key component in almost every project in each industry and the knowhow is also transferred in different seminars and workshops at the *Fraunhofer IGCV*.

# Economical evaluation of CFRP-process chains using Plant Simulation

SIEMENS
Ingenuity for life



- Fraunhofer IGCV
- Christine Probst
- Christine Probst studied aerospace engineering at *Technical University of Munich*. In the department *Factory Planning and Evaluation* at *Fraunhofer Research Institution for Casting, Composite and Processing Technology (IGCV)*, she is working as a researcher and consultant in the field of material flow simulations, production system planning and cost calculation. Her focus is on economical evaluation and comparison of CFRP-process chains as well as value chain analysis.




In the department of *Factory Planning and Evaluation* at *Fraunhofer IGCV*, *Plant Simulation* is one of the basic tools to visualize, analyze and optimize value streams. The individual configurability allows our factory planners to develop new libraries of process modules, add-ons to calculate certain key performance indicators and visualizations for industrial partners. Due to the deep knowledge of CFRP-processes, the researchers of the *Fraunhofer IGCV* build highly sophisticated CFRP-process modules, which lead to realistic CFRP-value chains, what-if scenarios and performance evaluations within minutes. This knowledge is not only used in the CFRP-industry, the simulative verification is a key component in almost every project in each industry and the knowhow is also transferred in different seminars and workshops at the *Fraunhofer IGCV*.

# Workshop(!) App based Value Stream Simulation in a Cloud Solution based on the Plant Simulation VSM Library

SIEMENS
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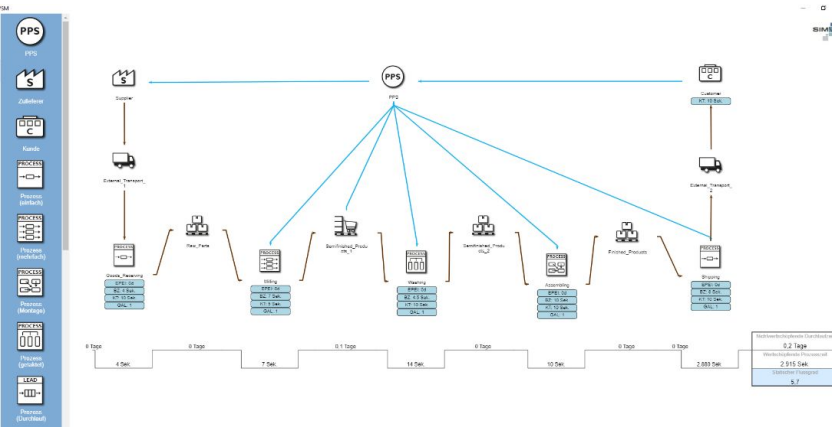
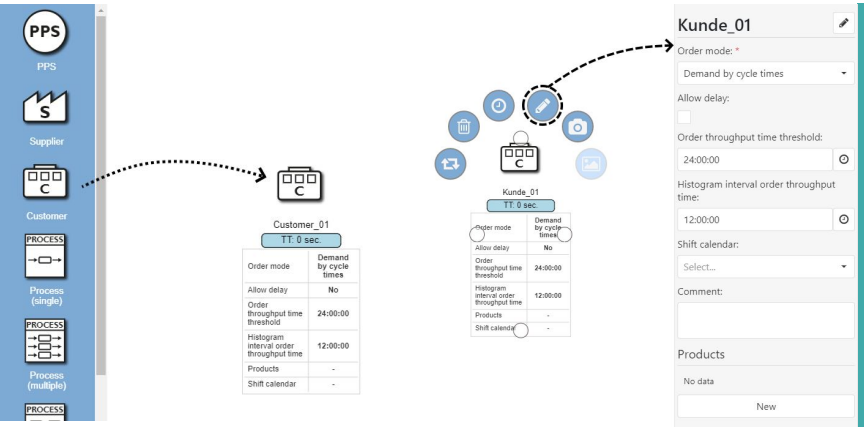


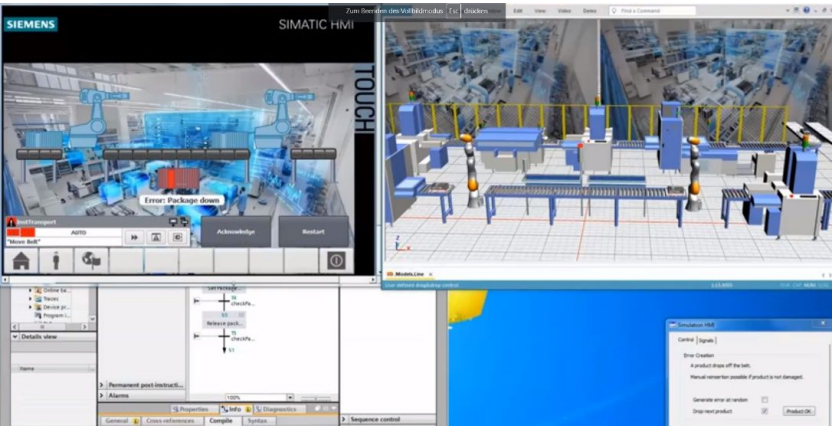

- SimPlan AG
- Stephan Stauber, Robert Forstner
- **Stephan Stauber**, born in 1968, finished his studies in mathematics at university of Bayreuth in 1994. He started his professional career as software developer of material handling and warehouse management systems for automatic warehouses in the US. He changed to SimPlan in 1999. Since 2002 he is in charge of the SimPlan office as branch manager in Regensburg. In addition to simulation and emulation projects, he has been participating in several research projects and was the technical project manager of the App based Value Stream Simulation Concept. His email address is stephan.stauber@simplan.de.
- **ROBERT FORSTNER**, born in 1991, holds a bachelor's degree in business informatics and a master's degree in logistics, both from the technical university of applied sciences in Regensburg. He has been working for and at SimPlan since 2011, after graduating in 2016 as a consultant. Besides working in simulation projects within the field of intralogistics, he has been participating in several research projects regarding online simulation, integration of simulation into decision support platforms as well as value stream simulation. In recent years, developments for value stream mapping and value stream simulation have also grown into one of his main activity fields. His email address is robert.forstner@simplan.de.


## Short description of the workshop:

Value stream simulation is used to assist value stream analysis and design. The workshop provides a first introduction to the ***app-based Value Stream Simulation Solution "SimVSM"*** which also uses the Plant Simulation "*Value Stream Mapping*" library. The participants will get an insight into the developed cloud base service concept and the automatic model generation based on XML Structures. Modelling a value stream, performing various simulation runs and comparing the KPI results will complete the workshop.

# Virtual Commissioning; Test real PLC Code against a Plant Simulation model




- Dr. Georg Piepenbrock
- Siemens Industry Software GmbH

PLCSIM Advanced 2.0 Support and Address Access to PLC I/O i-Device communication

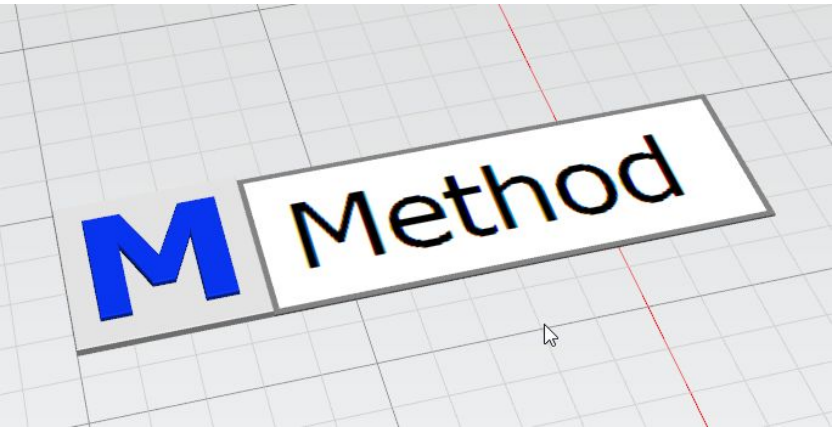
Plant Simulation supports the latest virtual PLC version from Siemens.
Address based access to PLC I/O is a mandatory data exchange pattern and often used in automation projects. Customer Benefit: Ability to use the latest virtual Siemens PLCSIM Advanced 2.0 Enhanced flexibility in VC projects with more than one PLC

i-Device communication can be used without changing PLC code in VC scenarios.

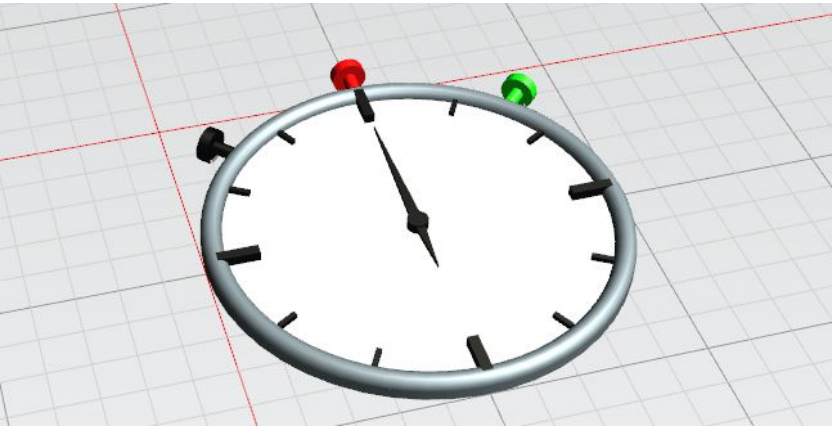
With free moving AGV also virtual commissioning use cases are possible where e.g. a PLC based AGV fleet manager controls the AGV driving paths and orders.

# Efficient SimTalk Programming and Debugging

SIEMENS
Ingenuity for life

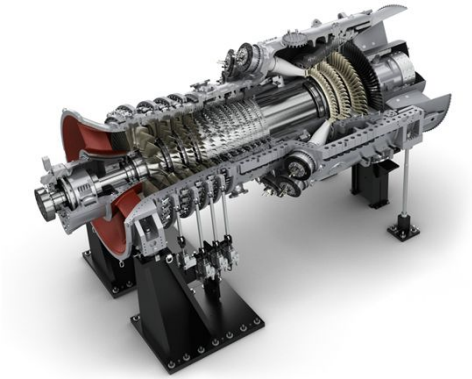



- Siemens Industry Software GmbH
- Michael Joos
- Michael Joos, born in 1971, studied computer science in the University of Stuttgart. He leads the Plant Simulation core development team at Siemens. Michael is working on the development and maintenance of Plant Simulation for 21 years.



- Efficient SimTalk Programming and Debugging
- Conditional Breakpoints
- Global and local Breakpoints
- Calculate with Arrays
- Using the Profiler and the Eventcontroler Eventlist
- Path show object and step into the object
- Show variables in the debugger

# Plant Simulation: Management of Material and Worker - First practical Results




- Siemens AG
- Dr. Thomas Stoffel


- Thomas Stoffel joined the Siemens AG in 2008. He studied electrical engineering and received Dr.-Ing. (PhD) in Transportation and Applied Mechanics from TECHNISCHE UNIVERSITÄT Berlin in 1996. In his doctoral thesis he investigated structural dynamics of magnetic levitation trains. In addition he worked on the control and transient behaviour of nonlinear dynamic systems. Later on he worked in IT management for putting into operation ITIL-based organisations. In his next position at Siemens AG he was responsible for a SAP rollout of quality management and subsequent SAP data analysis. Currently he is in charge of digital factory optimization using Plant Simulation in various production areas of the Gas Turbine Burner Plant in Berlin.

This presentation shows the first practical results of using Plant Simulation for optimized workers allocation and workstation usage in the Gas Turbine Burner production at the Siemens plant in Berlin. It covers the domains parts, routing, workstations, human resources and client (load plan). With its capabilities especially in human resources management it shows strong improvements of worker productivity.

# Modeling in 3D

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- Ralph Bauknecht
- Siemens Industry Software GmbH
- Ralph Bauknecht is a Technical Sales Consultant in presales department. He has been working at Siemens Digital Industries Software and its predecessors with Plant Simulation for more than 20 years.
- At the moment Mr. Bauknecht focuses on the Plant Simulation – Teamcenter – NX Line Designer collaboration with TeamcenterWizard.


Simulation models need to transport the advantage of an optimized planning scenario to non-experts. This is supported widely by 3D visualization and animation.

This presentation will show the new pose and joint feature, pick&place robot, graphics optimization, shadows, sky and more. Mr. Bauknecht will also talk about graphics import, video path definition and video capturing.

# Effective use of Custom-Built Class Libraries for Flexible and Automated Model Build and Verification - MTC Class Library

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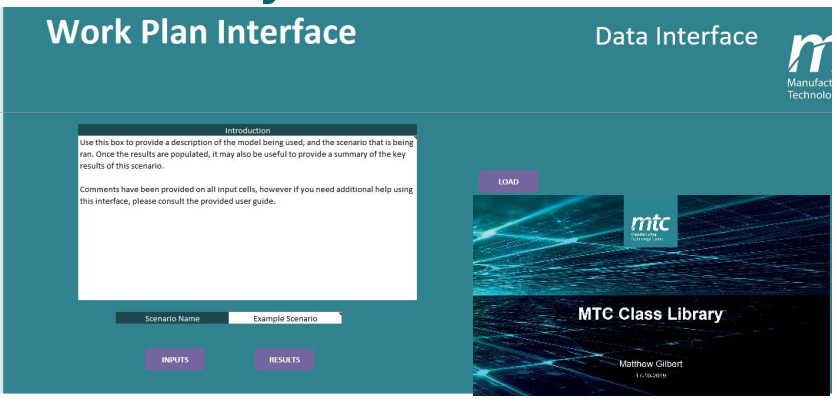
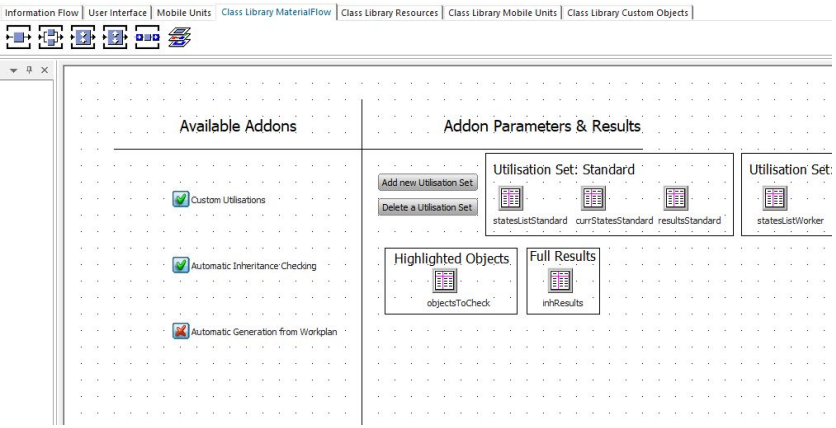



- MTC Limited, UK
- Dr. Matthew Gilbert
- Matthew Gilbert studied Statistics for his PhD at the University of Warwick, primarily focusing on a mathematical perspective of influence and group decision making. In 2017, he joined the MTC's Business & Factory Optimisation team, where he has assisted businesses in various sectors (FMCG, Aerospace and Automotive) through the use of modelling and simulation by exploring usage and integration with their business systems for developed models, and providing supporting evidence for investment or planning decisions. He is currently leading a project investigating adaptive maintenance scheduling through linking predictive modelling and optimisation methodologies that could be incorporated with predictive maintenance systems.




The MTC has developed a set of standard functionalities as a custom Class Library that have been used to complement the existing functionality offered in Siemens Plant Simulation. The use of this custom Class Library will be demonstrated using live models. Example functionalities include automatic inheritance verification, management of custom utilization states, enhanced multi-skilled worker allocations and a data-driven, automatic model build mode. It is developed in such a way that it is constantly evolving as further functionality is required. The MTC Class Library has been successfully used to reduce model build and testing times, especially for more standard models.

# Support of industrialization of Additive Manufacturing using SIEMENS Plant Simulation

SIEMENS
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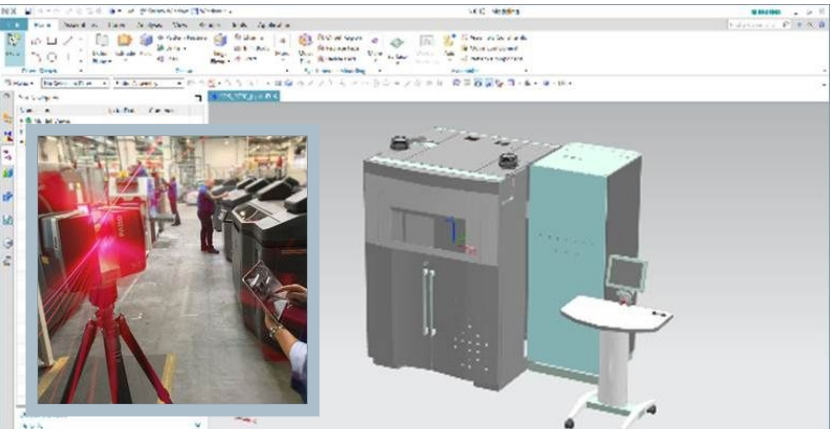
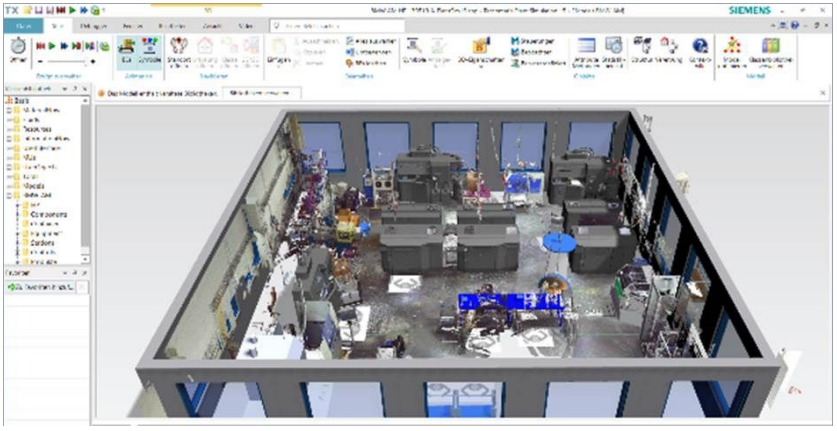


- Siemens AG
- Christian Rossmüller
- Christian Rossmüller has been working at SIEMENS AG for 20 years on the topic of digital factory planning. Already during the study of mechanical engineering, there were the first points of contact to Plant Simulation (then Simple ++) and also to the first VR applications in the field of factory planning. For SIEMENS AG and other companies, Mr. Rossmüller plans factories in various industries worldwide. For about 5 years Mr. Rossmüller has dedicated himself to the topic industrialization of Additive Manufacturing. These planning's are also supported by digital planning tools.



Looking at the processes of additives production, so you quickly realize that the printing process itself represents the bottleneck of the production. Due to long printing times, the upstream and downstream, mostly manual, processes are at first glance irrelevant. But since the printing process itself can be well parallelized and current machines can be easily automated, this raises the question of the ideal production line.

As there are currently few simulation studies for AM, it was decided that cooperation between Siemens and the Additive Manufacturing Center should be promoted at the BMW Group. The aim of the cooperation was to gain experience based on two examples, such as a tool set for the simulation of AM.

# Smart Plant Design with Plant Simulation and HEEDS

SIEMENS
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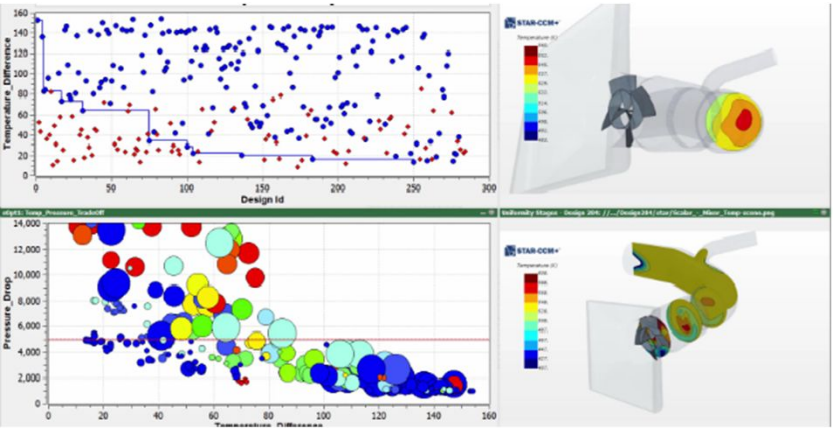
- Siemens AG
- Dr. Daniel Klein
- Daniel Klein is a Lead Engineer for Digital Engineering at Siemens AG, DI CS. In his role he is responsible for different R&D and customer projects with various software packages including Plant Simulation and Process Simulate. Before joining Siemens he worked at KUKA in the Solution Excellence Center where he was responsible for the introduction of new digital solutions in the engineering. Daniel Klein studied Mechanical Engineering and holds a Ph.D. in Digital Engineering from the FAU Erlangen-Nuremberg.




Simulation has become a gold standard for factory planners. With the help of simulation different concepts can quickly be evaluated, new set ups can be tested and planners gain an invaluable insight in their plant before it physically exists. To fully exploit the benefits of simulation a new approach is shown where Plant Simulation is connected to HEEDS to optimize a plant or to analyze correlations within the plant that were previously unknown.

# Digital Twin in the Cloud – the results of the EU Research Project “Optimised”

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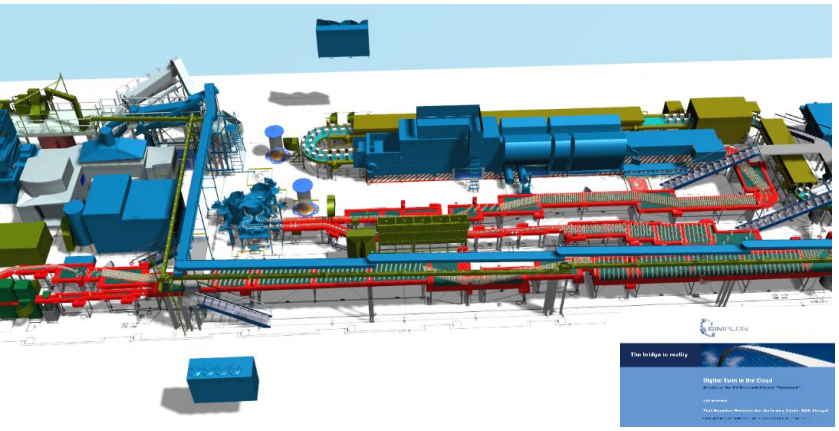
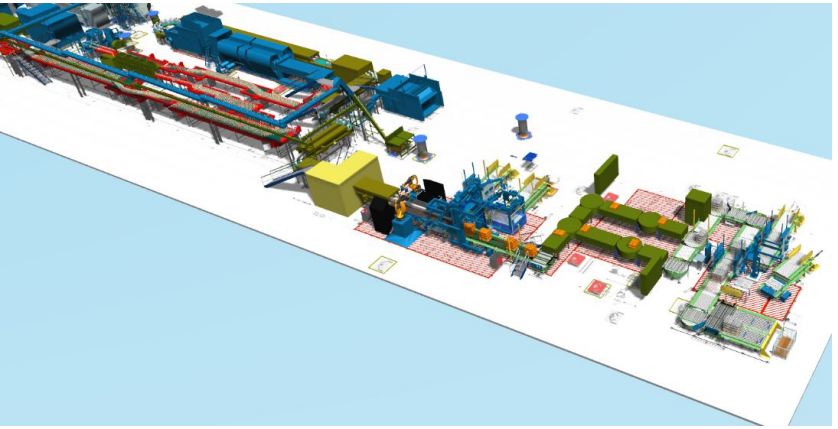


- SimPlan AG
- Dirk Wortmann
- Dirk Wortmann, born in 1967, finished his studies in computer science at the GKS Bad Homburg in 1988. He started his professional career in a Frankfurt engineering office and was involved in the development of simulation software and the implementation of simulation projects in the field of production and logistics. In 1992 he founded the company SimPlan together with his partner Sven Spieckermann. From the founding until 2013 he had been a member of the board. From 2010 to 2018, he set up and developed SimPlan’s Chinese subsidiary in Shanghai.



Digital Twin of a building components manufacturing: The EU research project “Optimised” was started in 2015 and finished in 2018. “Optimised” stands for Operational Planning Tool Interfacing Manufacturing Integrated Simulations with Empirical Data. The primary objective was the development and pilot implementation of a manufacturing scheduling optimisation system, which uses smart sensors and big data analytics to monitor, react to and improve manufacturing performance. Three demonstrators of different industries and application focuses were developed:

Demo 1: Alstom’s train fleet management for Virgin´s Westcoast Line in UK

Demo 2: Production order scheduling for a large machining parts production at Goimek in Spain

Demo 3: Planning and Optimisation of a building components manufacturing at Laing O´Rourke (LOR) in UK

# Plant Simulation 3D

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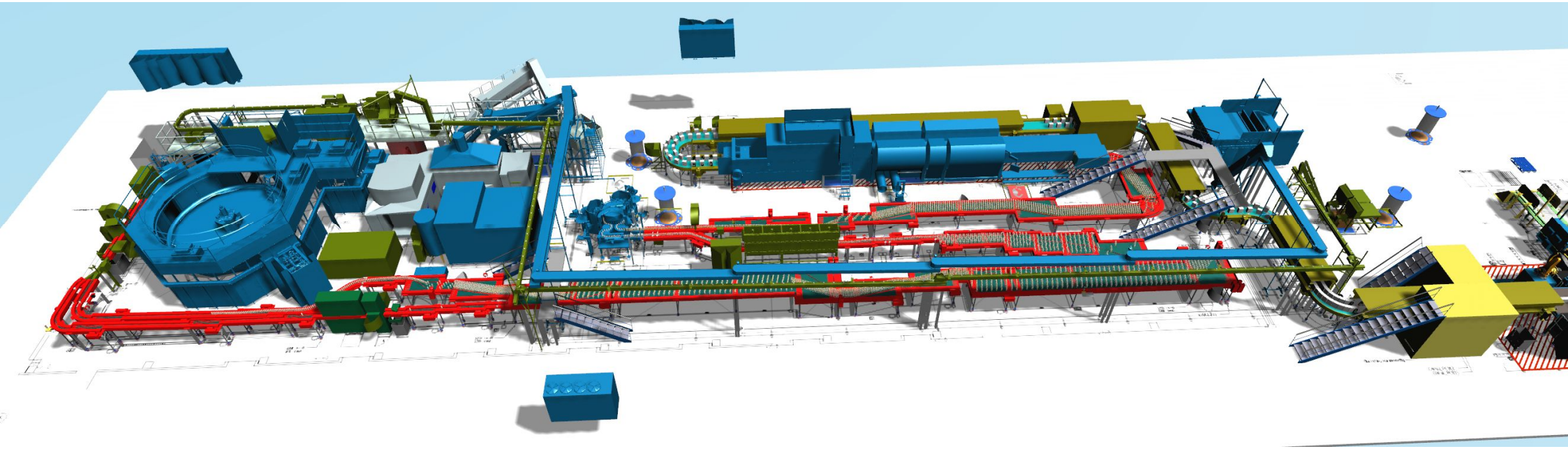

# Wire harness manufacturing using Tecnomatix Plant Simulation

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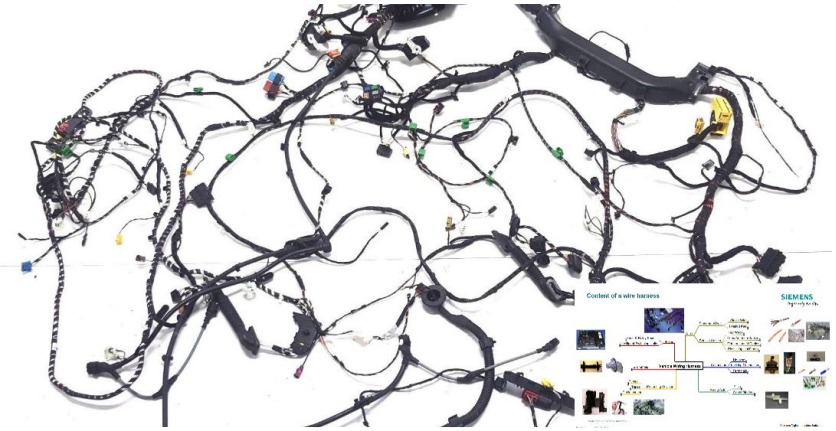

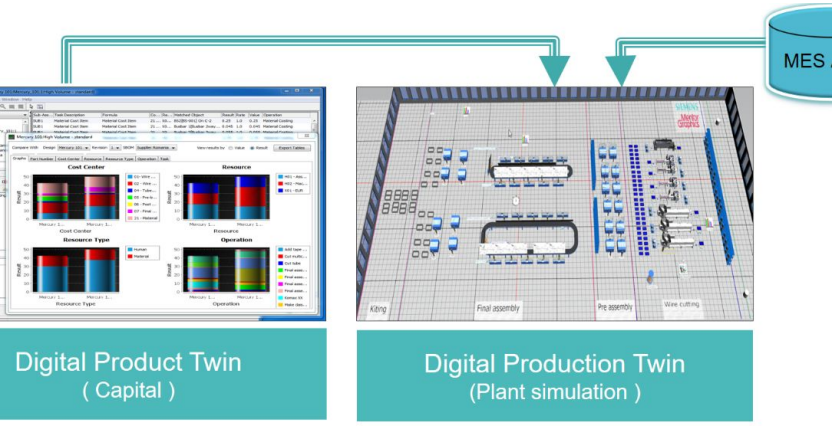


- Siemens Industry Software, s.r.o., Czech Republic
- Pavel Nosek
- Pavel Nosek worked in wire harness production engineering between 1995 and 2018 for Siemens and Yazaki, the largest global wire harness manufacturer. He was involved in the Customer-Specific Harness (KSK) concept creation at Siemens Automotive. In Yazaki, Pavel was responsible for KSK business implementation and concept modification for new customers. International corporations such as BMW, JLR, Mercedes, FCA, VW group, PSA, GM, Toyota, and Volvo were part of his portfolio. Harness manufacturing was located in Eastern Europe, North Africa, China, India, and the Americas. Pavel currently works as a Solution Architect at Siemens Industry Software on the extension of digital wire harness manufacturing solutions.

Simulation in the wire harness industry can extremely improve the manufacturing efficiency but will also support manufacturing engineering activities such as process scenario comparison and optimization.

# Mechatronics Concept Designer

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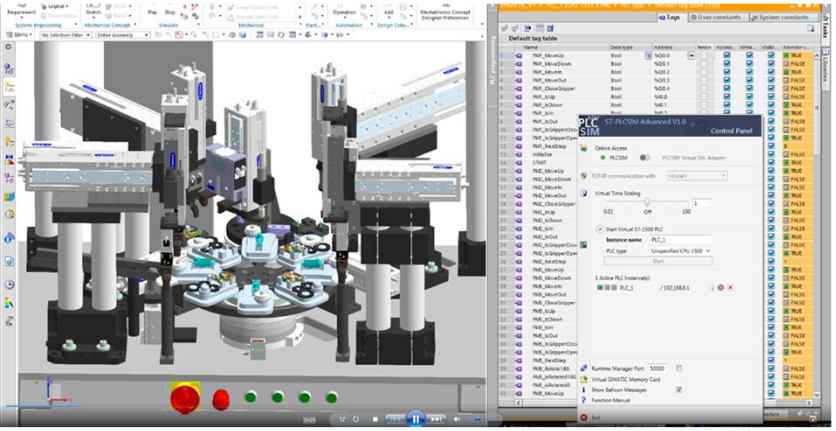
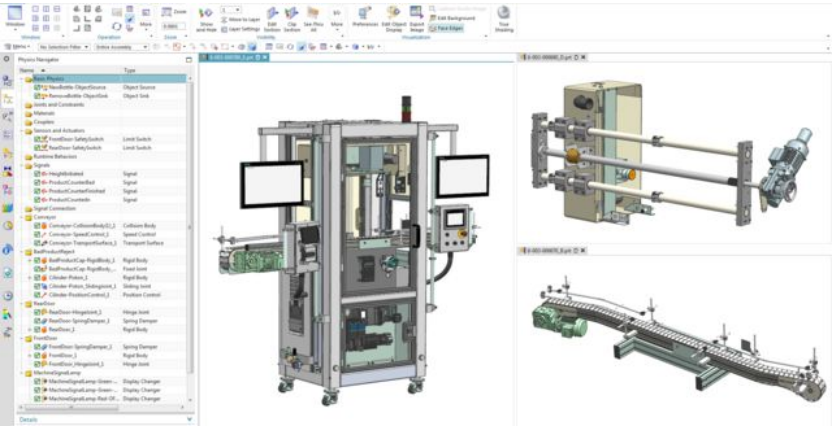


- Siemens PLM Software
- Victor Braun
- Viktor Braun is a Technical Sales Consultant in the PreSales department of Siemens Digital Industries Software. He has been specializing in the mechatronic machine development process, focusing on the simulation capabilities in the Siemens Portfolio with NX Mechatronics Concept Designer.
- Other topics currently include programming in the NX Open environment and other Siemens NX based Applications like NX Animation Designer or NX Motion.



This presentation allows you to peak into the world of mechatronic machine development with a new design approach of the Siemens Mechatronics Concept Designer (MCD), starting from the early concept phase of a new machine and evolving it up until the stage of virtual commissioning.

It will show how the Mechatronics Concept Designer is a multi-disciplinary design tool combined with a real-time physics simulation core and capabilities for kinematics, dynamics, mechatronic components like sensors and actuators as well as logical behavior of the full machine or of a simple concept.

# Analysis of complex power & free conveyor system using Tecnomatix Plant Simulation

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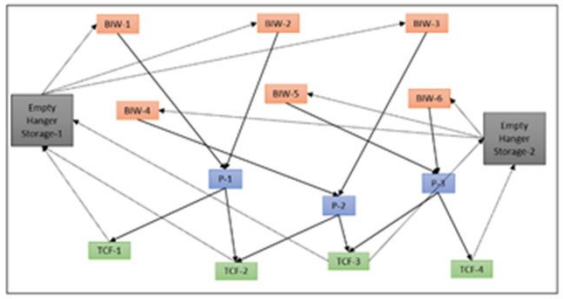
## The problem

**Company**

- Automotive plant for passenger cars
- Has 5 BIW, 3 Paint Shops & 4 Assembly shops
- Miles long, inter-connected spider-web of P&F conveyor systems to connect all those shops





- Shigeo Solutions India
- Harshkumar Dadhaniya


*Harshkumar Dadhaniya holds a master's degree in Industrial Engineering and Operations Management from NIT Trichy, India. He has started his career as simulation engineer at Production Modeling India where he worked on several independent projects with automotive giants to create throughput and material handling models in various DES software. He has also done projects using classical Operation Research tools like LPP, scheduling, assignment models & game theory in SAS & R programming language for outbound supply chains. In his second company, he has also lead a team of simulation engineers across a globe to make a custom-build libraries in Tecnomatix Plant Simulation. Around 6 months back, he has started his own consulting company to give consultancy in the field of DES and supply chain management.*

*There is a spider-web of a Power & Free conveyor system between 6 Body shops, 3 Paint shops and 4 Assembly shops in an automotive company. All the shops are inter-connected with each other. So whenever demand changes, the way hangers flow into this P&F system changes drastically. So the team which is responsible to manage the sufficient supply of these hangers at all the shops can't predict the behavior and do some mess-ups. So our objective is to create predictive tool in Tecnomatix Plant Simulation, which is going to reflect the exact behavior of system for any particular given set of demand. With help of this model, shop floor team can understand the future working of the hangers so that body shops can't get blocked and Assembly shops doesn't get starved.*

# Making 4D layout design tangible: Use cases of the edddison hareware UI

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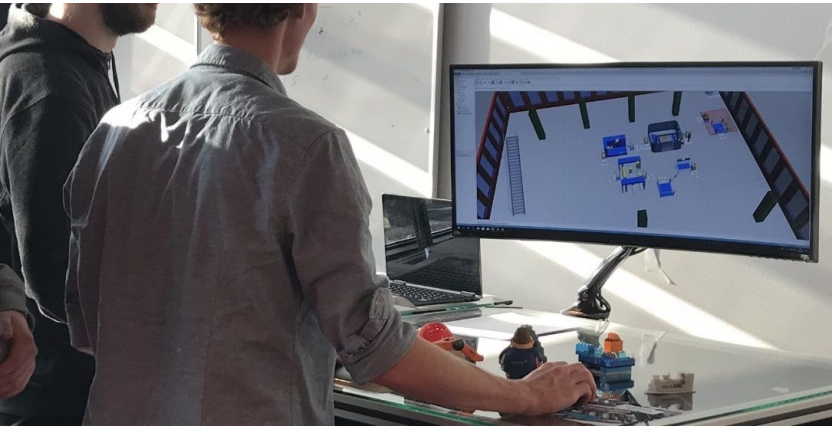
- edddison technologies OG Austria
- Thomas Kienzl, CEO
- Thomas Kienzl is an architect and designer by profession and obtained a master's degree from „Technische Universität" (TU) in Graz, Austria" and „Det kongelige Danske Kunstakademi" in Copenhagen, Denmark. He is the founder of edddison technology, developing the interactive software for Plant Simulation, and the studio 3D-Schmiede (formerly Kommerz), specializing in producing 3D Visualization for the AEC industry. For 25 years the companies have accomplished a lot. More than 1000 projects have been successfully implemented for over 100 customers.



edddison is an add-on for Tecnomatix Plant Simulation. It enables non technical people to navigate and interact with a 3D model and use the key features of Plant Simulation. The simplicity of the solution allows you to involve customers, managers and colleagues in the planning and design process. Made for people who want to plan and present better with Tecnomatix Plant Simulation.

For 25 years the companies have accomplished a lot. They have implemented quite a number of impressive customer projects, won prestigious awards, and presented at globally-renowned trade shows. With his team, he has been working successfully for several well-known companies such as: Nokia, Red Bull, City of Vienna, Graz, Istanbul, Daimler, Egger Wood, Magna, ÖBB, Permasteelisa, Tesla, EDF and others.

# 3D Simulation of next-gen autonomous vehicles in mixed-traffic container terminals

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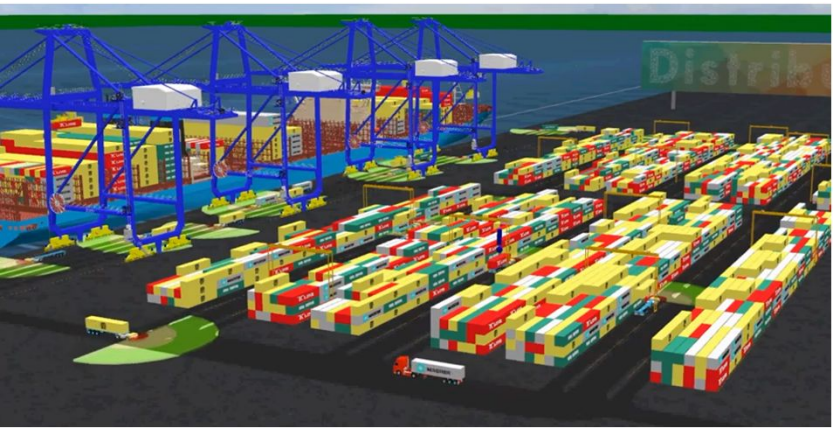
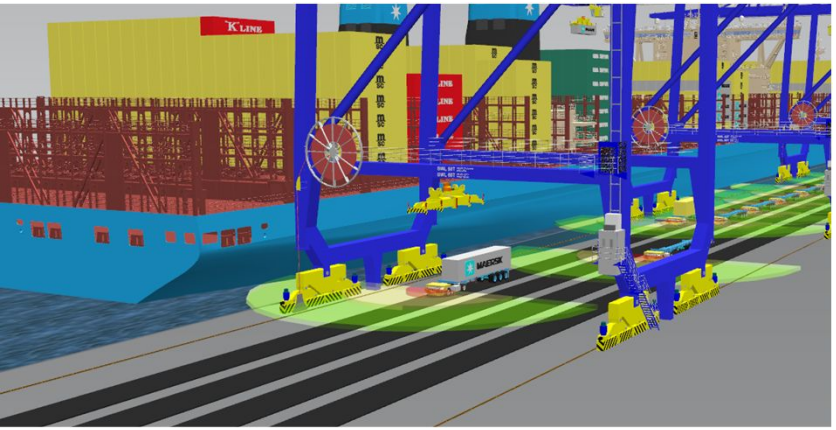


- Distribute Netherlands
- Berry Gerrits
- Berry Gerrits holds a master's degree in Industrial Engineering from the University of Twente, The Netherlands, specializing in Operations Research. In 2016 he founded Distribute to bridge the gap between scientific research and practical applications, mainly by focusing on simulation projects. He is also a PhD candidate at the University of Twente, specializing in distributed systems and self-organization of fleets of autonomous vehicles in the logistics and transport sector.



In collaboration with a large yard tractor manufacturer, Distribute studied the impact of a decentralized control approach of autonomous yard tractors in a container terminal.

In this presentation Berry Gerrits shows how simulation assists us in quantifying the impact of autonomous yard tractors in container terminals and how allowing mixing in manual trucks impacts overall performance. We elaborate on the modelling approaches of the various components of a terminal, including traffic control in Plant Simulation and provide a live demo.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Exhibition

# cards PLM Solutions B.V.

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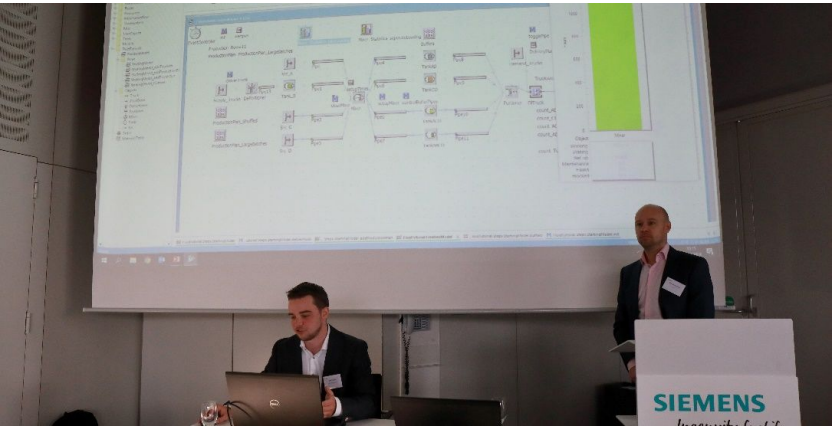
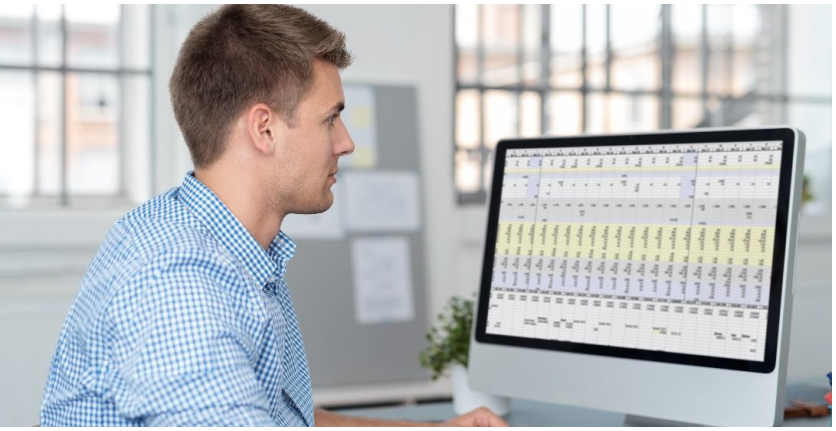
- Cards is a long term Tecnomatix partner and the first Expert Partner for Plant Simulation. Over the years, cards has developed the Plant Simulation for Warehousing and Logistics library which helps Plant Simulation users to rapidly design fully detailed warehouse and logistics models within days including WMS or MES logic.
- With this unique feature we offer our modelling, simulation and industrial engineering services to a broad range of different companies and industries around the world, being part of the strong Siemens Network.

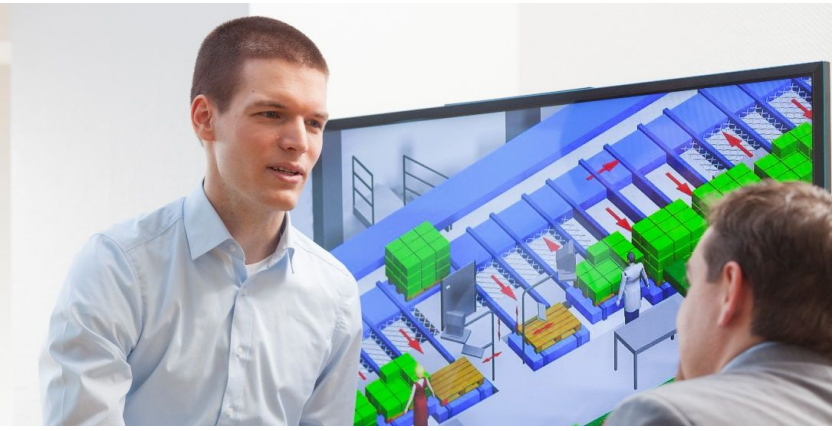



Cards PLM Solutions is a Tecnomatix business partner for about 20 years now. Proud to be the first Siemens global expert partner, we work with Siemens and Siemens partners on a global scale delivering technical and commercial knowledge and helping the siemens network leveraging their Plant Simulation business. Within the Siemens Network, cards is offering modelling and simulation services as well as Industrial Engineering services with a strong focus on material handling, warehousing, logistics and supply chain as well in fluid and continue processes.

# Miebach Consulting GmbH



- Miebach Consulting GmbH
- Contact: Michael Offermanns
- Some are Logistics Engineers, some are Simulation Experts. **We are both!**
- We are an interdisciplinary team of simulation experts and data sciences specialists. The right mix of expertise and industry knowledge leads to successful logistics projects. We provide inhouse and external simulation services to support all planning and design phases in new construction as well as conversion or expansion projects in production and logistics.



Miebach Consulting offers international supply chain consulting and engineering services in production and logistics in 24 offices worldwide. Throughout the entire supply chain, we develop holistic concepts for strategies, business processes and logistics functions, develop best-in-class solutions for the entire supply chain or individual areas and ensure on-time implementation.

# more3D GmbH & Co. KG

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- Eduard Kinas, born in 1974, has nearly 15 years of experience with VR. He joined the first steps of VR and took an important part in the evolution of VR hardware, when he started working for more3D in it´s first steps on the market. In addition to that, he supervised the development of VR software, nowadays as managing director of more 3D. MoreViz is one of the notable results of his work with more 3D.

more3D presents on 2019 Plant Simulation User Conference the pioneering moreViz software. After a short outline of the history of virtual reality (VR) a detailed picture of the profit of VR in connection with Plant Simulation will be drawn. An interactive demonstration of the VR bridge moreViz is the complement of the presentation.

# PPI-Informatik
## Scheduling with Plant Simulation

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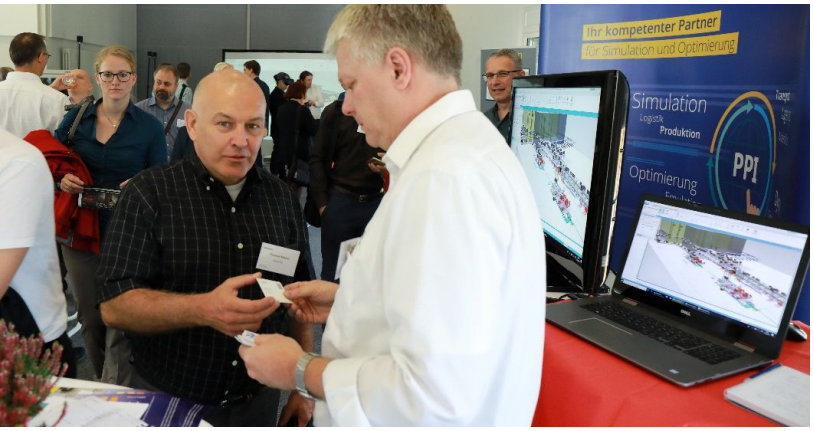


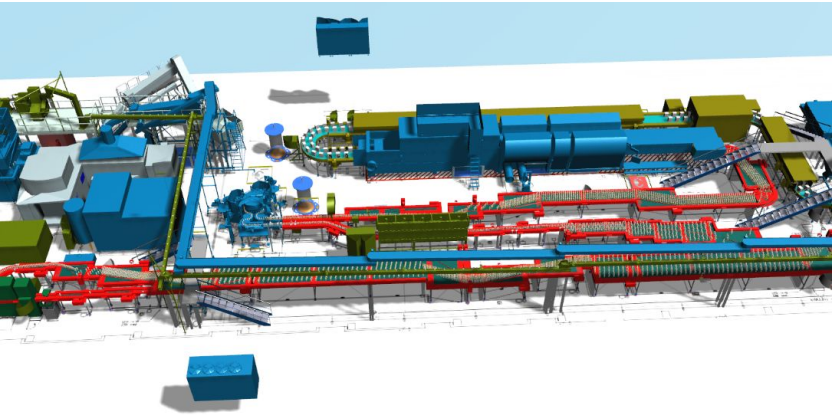

- PPI-Informatik
- Stefan Pfaff
- PPI-Informatik is a leading consulting house for complex material flow simulation tasks based in Sindelfingen, Germany

PPI recently was involved in many projects focusing on Production scheduling. These projects for different manufactures of different products share a common problem to be solved. How to schedule the sequence of the production orders in a way to maximize throughput, without violation of the complex constraints and rules that define a valid schedule for the specific operation. In most cases the constraints are linked to complex rules for resource allocation or to avoid downtimes by minimizing cleaning and set up operations which result from the sequence the orders are processed during manufacturing.

Typically these type of restrictions are difficult to handle for classical ERP based scheduling tools. PPI will show how simulation based Scheduling Tools based on a Plant Simulation process model and an Optimizer which is also build with Plant Simulation, works. Several use cases will illustrate the benefit of this Simulation based Scheduling approach and give an overview how to approach these type of projects.

# Simplan AG


- Dr. Harry Kestenbaum
- Simplan AG
- Harry Kestenbaum studied chemistry at the Johann Wolfgang von Goethe University in Frankfurt and earned his doctorate at the Max Planck Institute for Coal Research. After working as a simulation consultant for SimPlan AG, he was the technical managing director of a manufacturer of packaging machines for three years. To support the growth of SimPlan AG and the associated tasks in sales, he took over the position of Sales Manager in 2005 and was appointed to the Executive Board after eight years. In this function, Mr. Kestenbaum is responsible for sales and marketing at SimPlan AG.



SimPlan AG was founded in 1992 and is today one of the leading service providers for the simulation of production and logistics processes. Across industries, customers rely on the services of the experts, including companies from the automotive, trade and mechanical engineering sectors, ranging from independent advice on the selection of the right simulation software and IT-technical integration to the professional implementation of simulation projects - SimPlan offers users full service package using state-of-the-art simulation technologies. Headquartered in Hanau, today the subsidiaries include SimPlan Integrations and SimPlan Systems as well as branches in Braunschweig, Bremen, Dresden, Holzgerlingen, Munich, Regensburg and an office in Austria.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addendum

# Plant Simulation Web Forum

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- https://community.sw.siemens.com/s/topic/0TO4O000000MioZWAS/plant-simulation

Plant Simulation Forum

29001 POSTS

- Discussion Group
- Model exchange
- Useful tips and tricks
- Benchmarking
- New ideas
- Help and advises

# Plant Simulation Getting Started YouTube Channel

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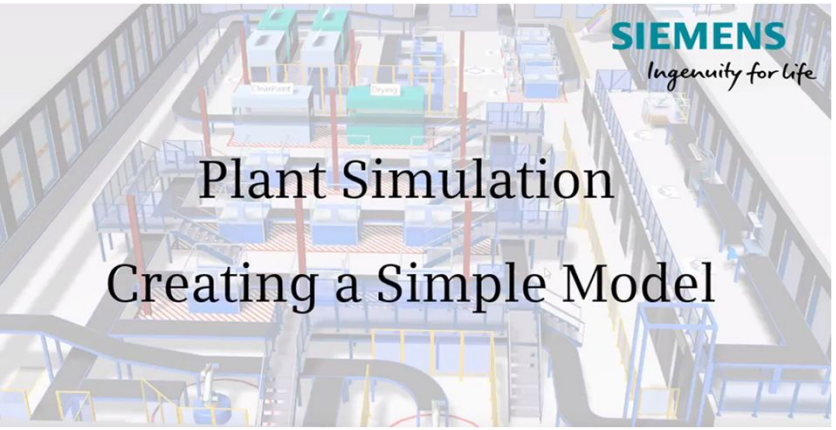
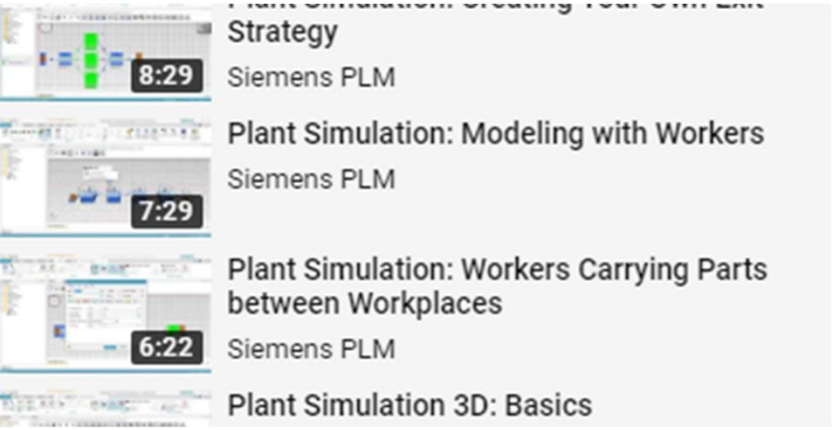



- YouTube
- **18 Introduction Videos published**
- **how to build Plant Simulation Models**
- https://www.youtube.com/watch?v=HUayvHqQulE&list=PL1m1vu8_quoAaezQsacD6jO_AK8Wvnjg-



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- Twitter
- https://twitter.com/plantsimulation?lang=en


News, releases, patches

# Nice Video Links

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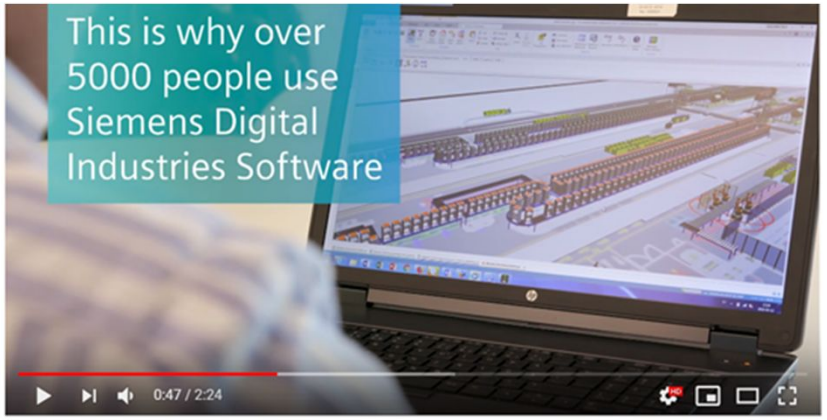
- Short Plant Simulation introductionn
- Solar industry
- Wind Power Logistics
- Procter and Gamble
- DAF_Trucks
- HOMAG: Success Factor Energy Efficiency
- Virtual Commissioning_Benefit
- Virtual_Commissioning_2
- Glasstec
- Electrolux
- Tire Industry
- AGVS_EK_Automation

# Success Story: The Swedish company Electrolux maintains operational excellence through digitalization.




- YouTube:
- https://www.youtube.com/watch?v=SaBrfBR5tXI
- The accurate results of Plant Simulation eliminate the need for large buffers, saving approximately $2,000,000 by having one conveyor and one high-bay warehouse for 5,000 refrigerators


Electrolux (www.electroluxgroup.com) is getting to market *20 to 30 percent faster and saving 15 to 20 percent in costs.* The Swedish white Goods manufacturing company Electrolux maintains operational excellence through digitalization. Electrolux is using Plant Simulation. This trailer highlights how Electrolux has embraced Industry 4.0 and digital manufacturing to guarantee that they can help "shape living for the better" for millions of people over the next 100 years…

# Is there more than just Tecnomatix Plant Simulation? Try NX CAM for free!

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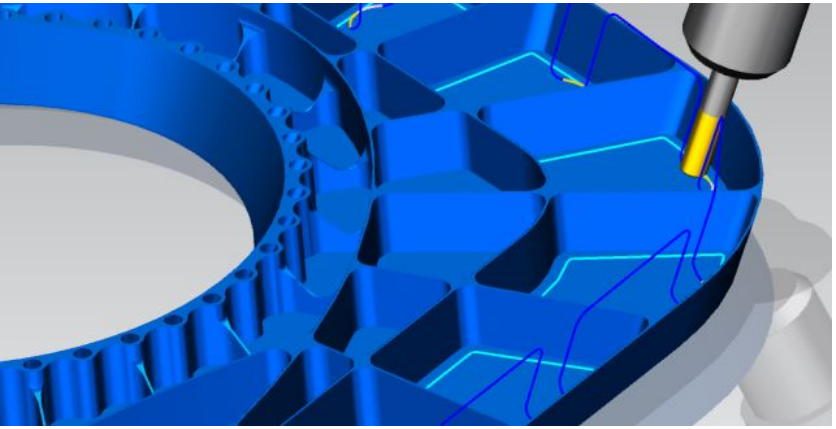
- A cloud based NX CAM trial has been made available.
- **Get started:**
- **Discover the powerful capabilities of Siemens' NX CAM, a complete solution for programing CNC machines and robots**



Automate programming using NX CAM's capabilities.

Integrated CAD tools let you prepare part designs and create machine setup assemblies, ensuring optimized and safe toolpaths. Validate CNC programs with G-code-driven simulation to reduce setup time and increase machine uptime.

# Contact

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