# Digital Twin Software

for simulation

SIM3D

Flow simulation from production to logistics

As a dynamic flow simulation tool, **Sim3D** is typically used during the design phase of machines and complete systems to validate the concept. The software allows the simulation of systems in their entirety and, if required, with stochastic elements such as availability. The significance of the results therefore goes far beyond static analytical methods such as Excel calculations.

Typical results from simulations are:

- System performance (output)
- Overall availability of the system (OEE)
- Utilisation of system components:
  - → Machines
  - → Robots
  - → Automated Guided Vehicles (AGV)
  - → Industrial trucks
  - → Stacker Cranes
- Necessary buffer sizes (e.g. decoupling buffer in the production area)
- Bottlenecks in the material flow
- Required number of vehicles, pucks (e.g. for AGV systems, electric monorail systems, MagneMover)
- Findings from What-if-studies

Layout   **Performance Data**

Order/ production data
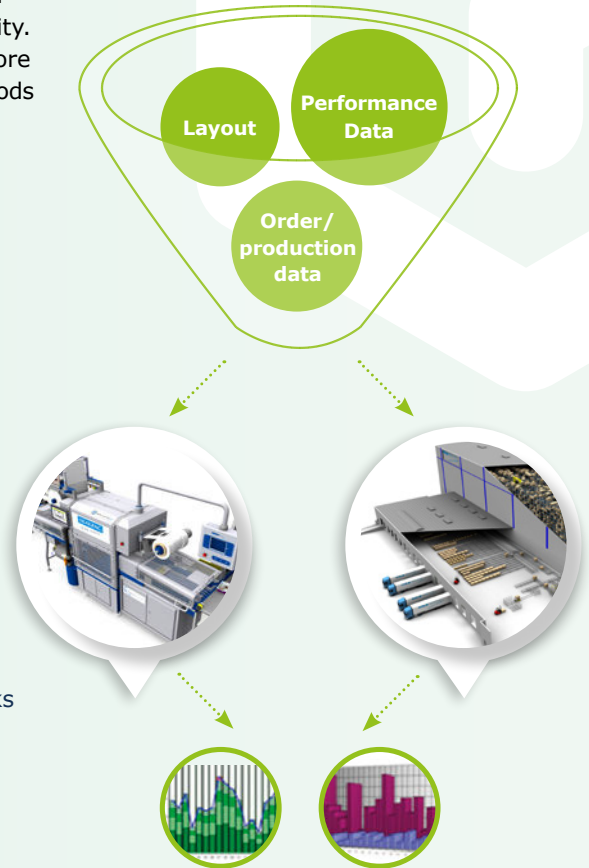
Picture: Methodology of flow simulation

Basic features

Sim3D provides a comprehensive range of libraries of components with properties to assist users in setting up their simulation models. The standard libraries include for example:

- "Smart Conveyors" for conveyor systems
- "Robots" for articulated, delta and scara robots
- "QuickLogic Racks" for any type of storage technology
- "Vehicles" for industrial trucks, overhead conveyor technology, automated guided vehicles
- "AMRs" for autonomous mobile robots
- "ICT" for Rockwell independent cart technology (MagneMotion)

MagneMover® is an intelligent and cost-effective conveyor system from Rockwell Automation, designed to move light loads quickly and efficiently. For the simulation of these systems, **Sim3D** provides a catalog that allows systems to be quickly modelled and simulated.

Picture: Simulation model of a tyre assembly, -sorting and buffering system

⭐ ▾ ▶ MagneMotion ▾ MagneMover LITE ▾

MML_1_Straight MML_0.25_Straight MML_Curve_Left MML_Divert_Left

MML_Divert_Rig MML_Curve_Righ MML_Merge_Left MML_Merge_Rig

Use of 3D-CAD - "CAD Is The Model" module: For the simulation of machines and handling equipment, it can be necessary and useful to create models based on 3D design data, for which **Sim3D** provides a variety of import interfaces. Once imported, the data is marked up using the "CAD Is The Model" module, this means the individual motion axes and joints are imprinted in order to obtain components that can be used for simulations. Native CAD interfaces are currently available for AutoCAD, Creo Parametric, Inventor, Onshape, Sketchup, Solid-Works and Solid Edge. Other formats can be imported via STEP or VRML.

Flow control: All standard components have a built-in and customisable flow control. Machines or robots can be controlled by an internal **Sim3D** controller.

For robots, it is also possible to have the axis positions controlled by a connected robot simulator or control emulator to simulate real trajectory. Standard interfaces to Fanuc Roboguide, Omron ACE, ABB Robotstudio and Yaskawa MotoSim are available for this purpose.

**Picture:** Sim3D enables the connection of robot simulators

Input data: For valid simulation results, a large number of input parameters (speeds, cycle times, job data, etc.) must usually be entered. These can be entered either directly in the simulation components or centrally in table structures. If required, data can also be read at runtime from databases, for which an ODBC interface is available, for example.

Picture: The Simanalyser module enables the assessment and visualisation of results data.

Experiments and reports: The Experiment Manager is available for automated execution of simulation runs. It allows you to create a series of experiments that will be run auto-matically.

The individual simulation runs are started in parallel and distributed across the available CPU cores in order to obtain the results as quickly as possible. The results data is visualised by the Analysis module, which displays typical metrics such as throughput, utilisation etc. in bar, line and pie charts. However, it is also possible to export the raw data and analyse it in Excel or other tools.
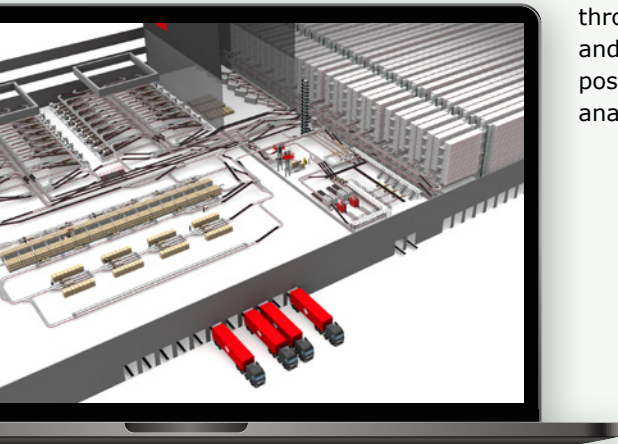
Advanced features

Sim3D can be customised and expanded in many places. These can be, for example, specific components, automatisms or connections from/to external systems. **Sim3D** offers the possibility to integrate and debug C# scripts from Visual Studio and Visual Studio Code. **Sim3D** thus becomes a flexible development framework that can be used to implement a wide range of different and even exotic solutions.

Sim3D Editions

In the event that **Demo3D** models have already been created in previous project phases, they can be developed into comprehensive simulation models with the assistance of **Sim3D**, thereby enabling a significant portion of the work to be transferred.

Similarly to **Demo3D**, **Sim3D** also offers the Professional and Enterprise editions. In addition to the Professional licence, the Enterprise licence allows the use of C# scripts, which can be helpful for the creation of parameterisable components and the implementation of complex material flows and movements.

Customers are among others

- Accenture
- Bühler AG
- Continental Tyres Germany GmbH
- Dachser Group SE & Co KG
- DHL Sorting Centre GmbH
- Dematic GmbH
- Ehrhardt + Partner GmbH & Co KG
- Fortna
- G. Siempelkamp GmbH & Co KG
- GEBHARDT Fördertechnik GmbH
- Interroll Group
- IWL AG
- Jungheinrich AG
- KHS GmbH
- KNAPP AG
- Körber AG
- Lidl Foundation & Co KG
- Miebach Consulting GmbH
- REWE Markt GmbH
- Schenker Germany AG
- SEW-EURODRIVE GmbH & Co. KG
- SWAN GmbH
- Swisslog GmbH
- TGW LOGISTICS GROUP GmbH
- Vanderlande Industries GmbH
- viastore SYSTEMS GmbH

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Dresden
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Hanau
Regensburg
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Sindelfingen
Munich
Neufelden
Vienna

SIM3D

Do you have any questions about the Emulate3D software?

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