



**SIMULATION SOLUTIONS AND APPLICATIONS  
FOR COMPLEX ONE-OF-A-KIND PRODUCTION PROCESSES  
BASED ON STS LIBRARY**

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**ABSTRACT**

There are various and specific challenges managing one-of-a-kind processes in the industry. Based on STS Library for complex production and logistics, SimPlan AG has implemented several simulation solutions for one-of-a-kind production supporting not only the strategic production development but also operative planning and control.

**1 INTRODUCTION**

Simulation application for complex one-of-a-kind production processes faces specific challenges and requirements: The product and its complexity determine main parts of the production process, different products or even variants require a different production strategies. The high number of variants within the complex product causes changing workloads throughout the production flow and in the production facilities. Bottlenecks are changing not even between different products or product mixes but also within one construction project.

For the challenges of one-of-a-kind production, SimPlan AG provides a set of solutions around the STS Library for complex production and logistics. These solutions have been applied in different industries fulfilling several objectives.

**2 SIMPLAN AG**

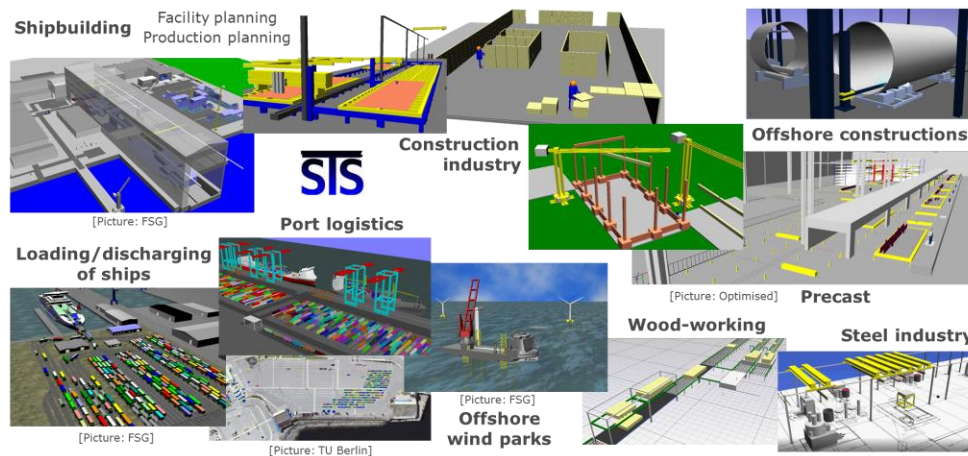
SimPlan AG was founded in 1992 and is today the leading service provider for the simulation of operational processes in production and logistics. Customers from all sectors rely on the services of the "simulants", including companies from the automotive industry, trade and mechanical engineering. From independent advice on the selection of the right simulation software, IT integration and the professional implementation of simulation projects to the creation of digital twins - SimPlan offers users a full-service package. State-of-the-art simulation technologies as well as augmented and virtual reality solutions are used. The company is headquartered in Hanau. Today, the group includes the subsidiaries SimPlan Integrations and SimPlan Systems as well as branches in Braunschweig, Bremen, Dresden, Munich, Regensburg and Sindelfingen. The simulation service provider covers international markets with a branch in Austria and another in China. SimPlan AG employs a total of 120 people worldwide.

### 3 STS LIBRARY

The development of STS Library started in the year 2000 at Flensburger Shipyard as the Simulation Toolkit Shipbuilding. After years of cooperation, SimPlan AG took over STS Library administration and development in 2016. STS Library is based on the simulation software Plant Simulation by Siemens.

STS contains a large variety of simulation tools for material flow modelling, model management, process control and execution strategies, data input management and output analysis. Especially the management of input data about the product, the planning and the resources requires several different support and preparation tools, because data often is not sufficiently available in the related industries.

In the meantime, only few tools are still strongly related to shipbuilding production respectively to steel fabrication aspects. Most of the tools provide a more general functionality for fabrication, assembly and logistics usable in many industries having comparable production conditions (Figure 1).

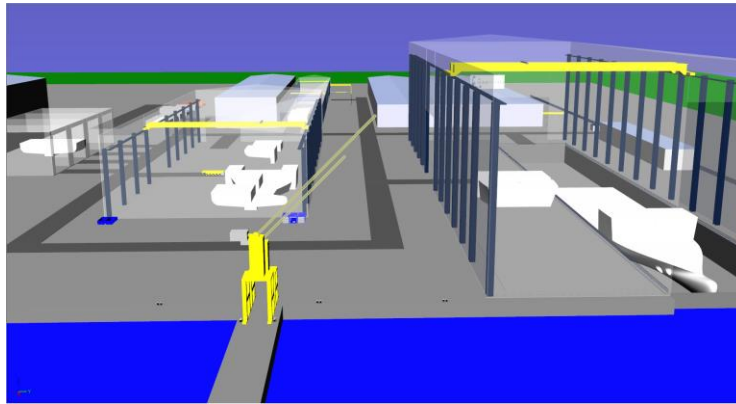


**Figure 1: Application Fields of STS Library**

### 4 APPLICATIONS IN ONE-OF-A-KIND PRODUCTION

In addition to using the simulation for the support of strategic decisions, there is a strong potential in one-of-a-kind production for using simulation in the operative planning and control. Current or upcoming situations are analyzed continuously considering the dynamic dependencies between the complex product, the production process and the resources. For these applications, the simulation is embedded in the PLM infrastructure of the company providing up-to-date data for the simulation input. As one example, several applications have been implemented in the maritime industries. In cooperation with Siemens, a shipyard PLM demonstrator was developed showing the digital thread from CAD to simulation as well as the various simulation capabilities in these kind of industries (Figure 2).

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**Figure 2: PLM demonstrator - Simulation model of a shipyard based on STS Library**