

MODEL MACHINES

Creating a digital twin of supply chain systems can help customers to test the validity of projects before and during implementation



For 10 years Solystic has been developing its SOSi simulation platform for its own needs. SOSi was initially designed to test Solystic equipment control software without the need for the physical machine. For this, Solystic creates a virtual model of its machine that can interface with the software and enables it to run in real time under the exact conditions of a physical machine: the software sees the sensors of the machine and acts on its actuators exactly as it would in reality. SOSi can integrate different types of models (discrete, continuous, multi-agent, etc), which gives it both a great flexibility and a capacity to adapt to a large number of configurations.

SOSi is now being used to test systems, with three objectives: to model these at a high level to establish their relevance and verify their dimensioning; to test the most critical system components at the finest level, first virtually, and then on the target hardware; and to integrate the various components of the system (virtually and physically) until they are put in place on the customer site.

System development Solystic put SOSi into practice using a rigorous methodology of continuous integration within the framework of its large projects, from the pre-sales phases to the final integration on-site.

The new generation of Solystic's XMS 2 mixed mail sorting machine has been designed and developed by first carrying out the unitary validation of the different subsystems (core machine, automatic feeding of trays, conveying integrated in the machine, shuttle transfer of the full trays).



The subsystems were first integrated two by two, and then all together. Each step was performed with the digital twin before moving to the physical target.

A total automation project for the sequencing of factor rounds has been developed for one of the largest international postal operators, and this digital-twin method was used for testing the machines with new robotic components, conveyors and a storage system. This very ambitious project has been realized in a very short time with a final integration of subsystems coming from several partners on the customer's site without the need for a factory integration beforehand.

Future plans Today, Solystic provides a service to companies that want to obtain the digital twin of their equipment and systems for testing.

In the coming months, Solystic will give a new momentum to SOSi by extending it to complete modeling of the industrial and logistics supply chain. This new step in the development of SOSi will be carried out through an ambitious collaborative project that brings together the contributions of research laboratories and industrialists from the Auvergne-Rhône-Alpes region, based on the achievements of Solystic and SOSi.

The objective of the project is to take into account all aspects of the supply chain to implement a faithful copy of it. Users of the model will be able to pilot their supply chain in predictive mode, to test alternative scenarios of engagement of material and human resources to facilitate evaluation of their impact and benefits. Beyond

KEY FACTS

- SOSi enables Solystic to test virtual models of its physical machines
- The company is working with a large postal operator to integrate a new sorting system on-site
- The SOSi system will be extended to conduct complete modeling of the logistics supply chain

Far left: Virtual simulation of the XMS 2 shuttle

Above left: The mixed mail sorting machine in real-life operation

Below: Modeling of an industrial and logistics supply chain



simulation, an emulation mode will enable optimization strategies to be tested in full scale by interfacing with the model of the supply chain target.

One of the most important contributions of the project will be to stimulate the emergence of a new skill: the process scientist will be an augmented version of the process engineer, who will use all the power of the digital tools at his disposal. Solystic will thus bring to its customers and partners a greater control over the behavior of their supply chain in its entirety, thanks to the digital twin and SOSi.

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