

Simcenter Amesim Mobile Hydraulic Actuation Systems

Design mobile hydraulic systems to satisfy ever-increasing demand for high performance

Benefits

- Full vehicle modeling for multi-attribute balancing
- Model scalability from component geometry representation to functional description
- Investigate modal couplings with frequency analysis tools
- State machine helps develop complex command laws with priority logics
- Interface with Matlab/Simulink for easy coupling controls from MiL, SiL and HiL simulations

Summary

Simcenter™ Amesim™ software features exhaustive multiphysics modeling capabilities for mobile hydraulic systems. This solution helps you integrate hydraulic components within a complete system and assess subsystems interactions within the full range of operating conditions. To investigate instabilities and noise, vibration, and harshness (NVH) issues, functional models can be combined with detailed component models.

Simcenter Amesim Mobile Hydraulic Actuation Systems

Simcenter Amesim Mobile Hydraulic Actuation Systems helps improve fuel consumption and emissions levels consequent to control strategies and specific architectures (hybrid versus standard configurations). With this solution, integration issues can be solved early in the development cycle. The following are reasons why this is the ideal

tool to meet the challenge of designing high-performance vehicles:

- Reduction of pressure pulsations and improvement of NVH characteristics
- Correct sizing of drivers and actuators for all working conditions
- Optimal energy consumption with hybridization strategies
- Improved systems' safety and reliability
- Management of smart control functions for sophisticated systems
- Integration of real mechanics (1D, 2D planar and 3D) to the hydraulic actuation system

Capabilities

Powerful hydraulic solutions

Hydraulic libraries allow you to address several simulation needs. You can access functional hydraulics to study prevailing behaviors at system level, evaluate detailed pressure losses in high-flow/low-pressure conditions and perform accurate component design by taking into account full component dynamics.

All components of mobile hydraulic systems such as pumps, valves or actuators can be modeled in a functional way by using a set of predefined and easy to use components. You can also model them in a very detailed way using our component design libraries which offer flexibility and allow you to explore multiple design solutions.

Simcenter Amesim Mobile Hydraulic Actuation Systems

For positive displacement pumps, a computer-aided design (CAD) import tool allows you to generate a complete detailed pump model starting from a pump CAD. In addition to the CAD import tool, all the pumps models, including axial piston pumps, vane pumps, gerotor pumps or external gear pumps, are linked to a setting tool. This tool allows for an easy and quick parametrization of the pump geometry and gives access to preprocessing meaningful variables. This allows you to shorten your analysis time and check the pump design.

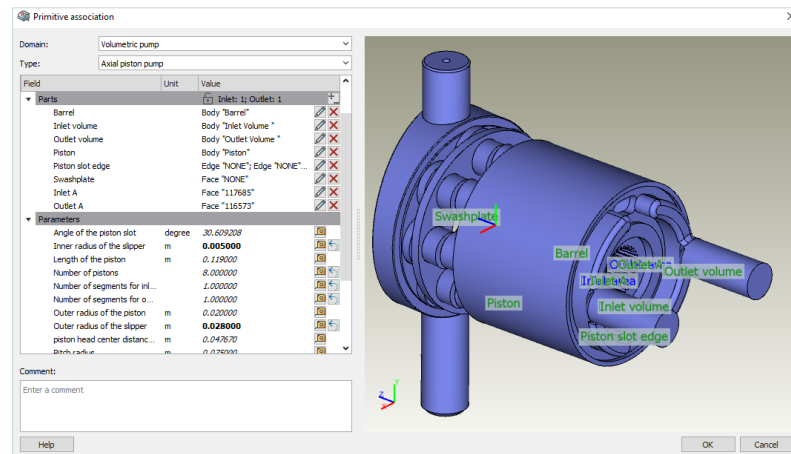
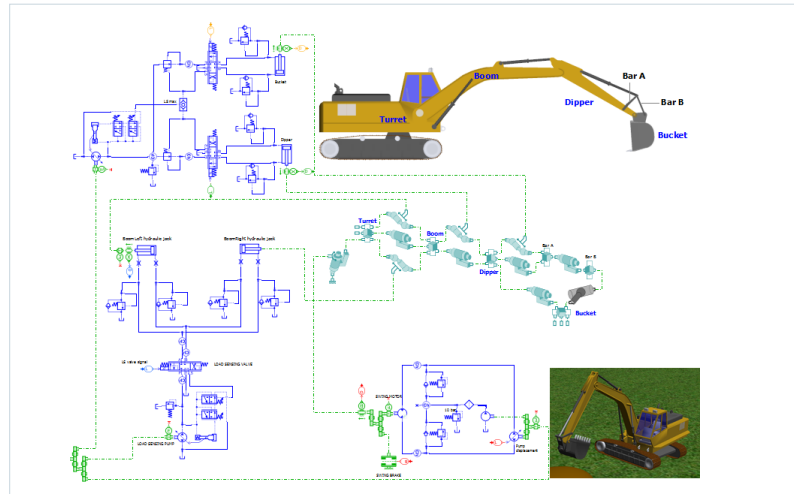
For valves design, several specific tools allow the easy creation of customized directional control valves models (with the valve builder) and a visualization of the component geometry as well as a preview of a valve's opening (with the component design configuration tool).

Full compatibility between hydraulic libraries allows a gradual increase of the modeling complexity where necessary.

Additional effects like heat exchanges or designing internal combustion engine (ICE) cooling and heating, ventilation and air conditioning (HVAC) systems are facilitated by the straightforward integration of dedicated components from thermal and two-phase flow libraries.

Energy recovery and hybridization

Simcenter Amesim, part of Xcelerator, a comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software, allows you to develop full vehicle models with hybrid or full-electrical architectures. Its versatility is a key advantage in estimating fuel consumption and energy savings introduced by recovery systems. The impact of architecture choices on performance can be seen early in the development cycle thanks to the complete covering of complementary physical domains (electrical, thermal, mechanical, etc.).

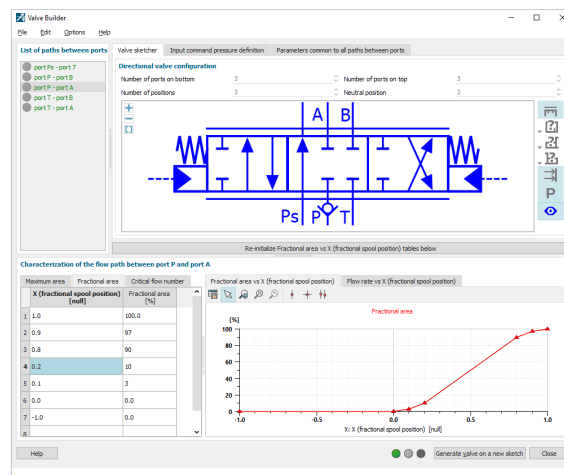
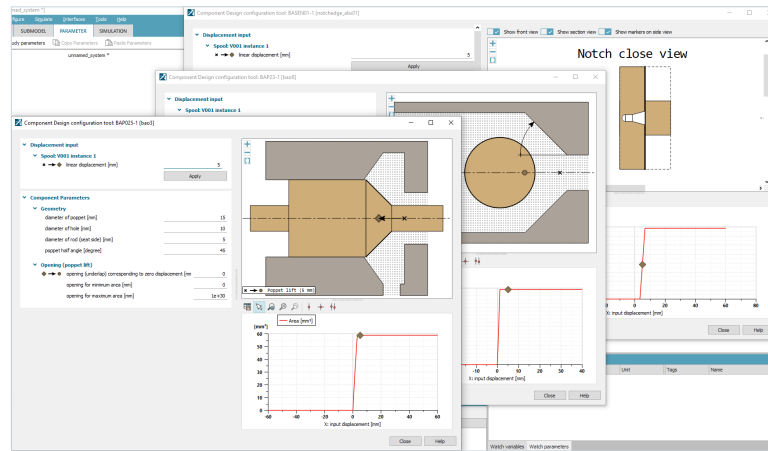


Statechart environment: complex scenarios design

Statechart is a dedicated tool in Simcenter Amesim that helps define the state machine scenario, like mission profiles, control logics and sequences of operations considering initial and intermediate states, transition conditions and priorities.

Controls integration: MiL/SiL/HiL

- Implement first level of control logics thanks to standard libraries
- Full interfaces with Matlab/Simulink and LabVIEW
- Blackbox option for shipping stand-alone plant models to Simulink users
- Import of C-coded control logics
- Code export to real-time platforms
- Complementary features allow you to analyze model performance (run statistics, state contributions, etc.) and its frequency content (linear analysis) to tailor it to real-time simulation constraints



Siemens Digital Industries Software
[siemens.com/software](https://www.siemens.com/software)

Americas +1 314 264 8499
 Europe +44 (0) 1276 413200
 Asia-Pacific +852 2230 3333