Simulink extends reach to hydraulics

SimHydraulics is the latest in the line of multi-domain physical modeling tools offered by **The Mathworks**, joining SimPowerSystems, SimMechanics, and SimDriveline as part of the Simulink environment. SimHydraulics allows developers of controlled hydraulic systems to describe multidomain systems containing connected hydraulic and mechanical components as physical networks.

SimHydraulics provides engineers with the hydraulic building blocks to calculate pressure and flow through standard and nonstandard components. More than 75 hydraulic and mechanical components such as pumps, valves, accumulators, and pipelines are built into the system. Custom components can also be integrated into a system.

"You can use Simulink and just its mathematical capability to model anything to basically describe how you want that special or custom hydraulic component to work," said Paul Banard, Marketing Director, Control Design, The Mathworks. "You can take the flow rate or the pressure at any point in the circuit, go through some calculations just expressed in Simulink, and put back into the circuit a new pressure or new flow rate."

SimHydraulics includes capabilities to model and simulate the conversion of hydraulic power into driving torques and forces for mechanical motion, the effects of opening and closing valves, and simple mechanical components. It also contains a customizable library of common hydraulic fluids.

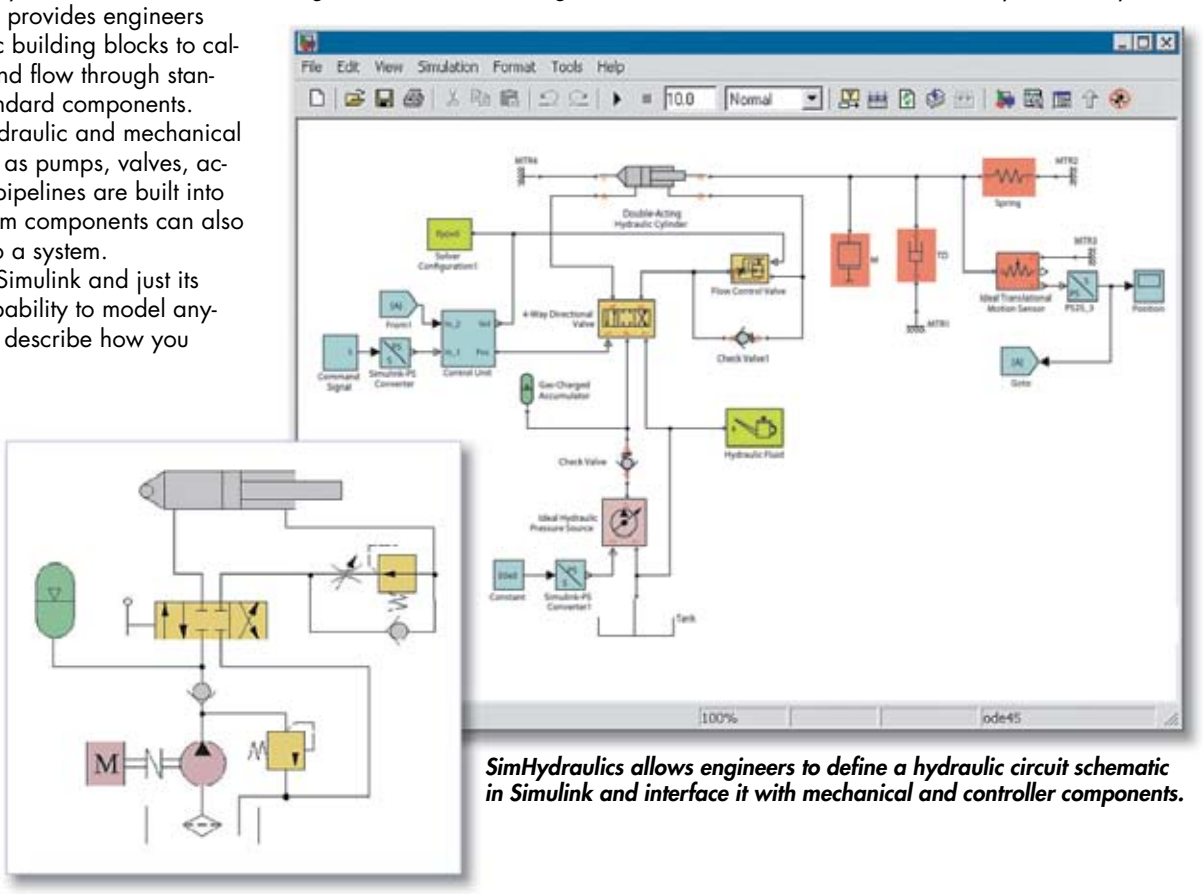
Because a hydraulic system can be tested within the Simulink environment, the physical system model can be tested. Engineers are then able to conduct testing and verification throughout the design process, finding design flaws in the control system development before implementing the hardware.

"With SimHydraulics you can just place on the screen a pump and a valve and a motor or actuator and connect those up in the way that you'd physically expect those components to be connected and then simulate all that on your desktop with the control algorithm in the loop," said Banard.

SimHydraulics has attracted a great deal of interest from aerospace and defense clients, according to Banard. It can be used for a variety of applications including actuating flight control surfaces. The system is expecially suited for today's more complex flight control systems.

"A lot of flight control actuation is hydraulic, and the trend in aerospace has been to move away from all-hydraulic to systems that are electrical and hydraulic where you transmit the commands electrically, but then there's a localized hydraulic actuation system at the flight control surface," explained Banard. "You still get the advantages of hydraulic systems in terms of power, but you save weight on running hydraulic lines all over the aircraft."

Matt Monaghan



SimHydraulics allows engineers to define a hydraulic circuit schematic in Simulink and interface it with mechanical and controller components.

Briefs

The **National Aerospace Laboratory NLR** in the Netherlands selected **Vistagy**'s FiberSIM software for use in designing complex composite products and parts. Engineers at NLR's Automated Composites Manufacturing Technology Center will use FiberSIM as their specialized composite design environment to more efficiently and cost-effectively create pre-formed parts with reduced development risks, costs, and cycle times, according to Vistagy.

Hamilton Sundstrand purchased high-performance compute and storage technology from **Silicon Graphics** (SGI). According to SGI, Hamilton Sundstrand has increased the speed of computation-intensive structural analysis and CFD analysis since the Altix and InfiniteStorage scalable storage systems were installed as part of the company's switch from Unix OS-based systems to the Linux OS environment.

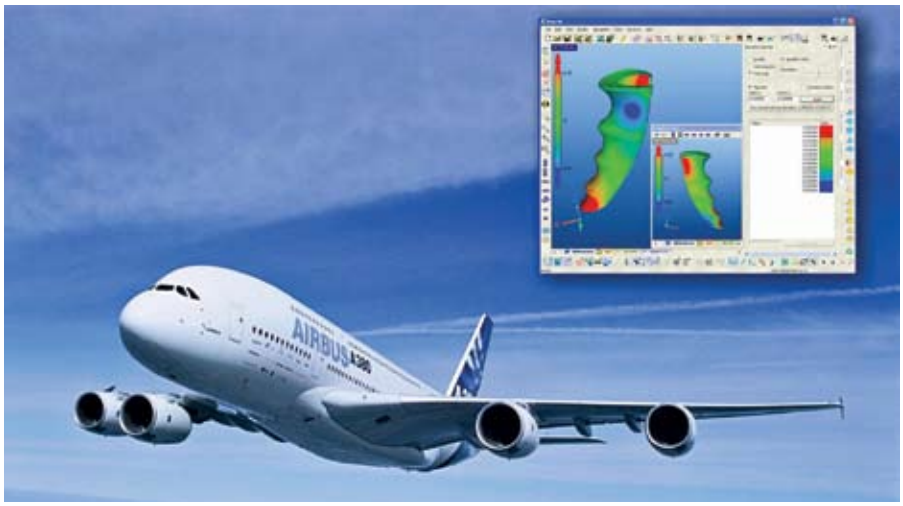
Flomerics has acquired Frankfurt, Germany-based **NIKA**, the Engineering Fluid Dynamics (EFD) software company that specializes in simulation tools for the prediction of fluid flow and heat transfer. EFD is a suite of CFD software simulation programs used as part of the design process for a variety of products including vehicles and electronic equipment. NIKA's clients include **Lufthansa**, **Alcatel**, **BAE Systems**, and **Thales**.

CMC Electronics has selected **Green Hills Software**'s Integrity-178B, an ARINC-653-1 full-time and memory-partitioned real-time operating system (RTOS), to support the development of integrated cockpit avionics solutions. Integrity-178B will be used in the development of a new CMC aircraft management system product line. It supports an all-glass cockpit anchored by two CMC integrated avionics computers. The mission system uses a PowerPC 7457 processor and will support multiple display functions.

3-D fitting software helps solve complex manufacturing problems

Kotem Technologies, a developer of GD&T (geometric dimensioning and tolerancing) and fitting software for precision metrology, has added capability to its SmartFit 3D best-fitting and analysis software.

SmartFit 3D troubleshoots manufacturing processes by incorporating data from popular CMM, video, and laser metrology systems to find the best coordinate system for machining and assembly. This software assesses profile tolerances on complex surfaces, provides advice on corrections by simulation, and solves misalignment and location problems so that parts can be repositioned.



Airbus relies on SmartFit software (inset), by Kotem Technologies, to increase assembly speed and enhance quality during final assembly of the A380, the world's first full double-deck jetliner.

SmartFit is used by **Airbus** in final assembly of the 555-passenger A380, the world's first full double-deck jetliner.

Airbus relies on SmartFit software during final assembly of A380 fuselage sections, the central structure of the aircraft that contains the passenger and cargo departments. With its three-dimensional fitting capabilities, SmartFit has increased assembly speed and enhanced quality.

According to Kotem, the newest version of SmartFit 3D offers improved visualization and data control, and simplifies the user experience with a redesigned graphical user interface (GUI) and expanded import/export functionality.

SmartFit 3D includes new graphical capabilities for the visualization of objects and surfaces in three dimensions, which allow quality control and manufacturing specialists to "see" the secrets of their processes. New functions such as transparency, silhouette, perspective view, light positioning, advanced zoom, the ability to simultaneously view multiple renderings, and color deviation add resonance to a virtual environment where even hidden part features and attributes become apparent. An expanded set of commands allows greater control over geometry data, which combine with advanced best-fitting mathematical methods to achieve desired results. GUI enhancements include customizable menus, toolbars, and docking windows to make the process easier to operate and configure. Import and export functions are extended with the new SmartFit Model format, a single, compact file format that contains both the original model and any changes to it.

"These enhancements to SmartFit 3D simplify the user experience while providing greater insight into the manufacturing process," says Kotem Technologies President and founder Kostadin Doytchinov. "This new version offers numerous design and technology enhancements that expand and develop its capabilities."

Matt Monaghan