FLUIDESIGN goes with the mechatronic flow

French suppliers of “smart” hydraulic components turn to LMS Imagine.Lab AMESim to solve dynamic instability issues...and save time

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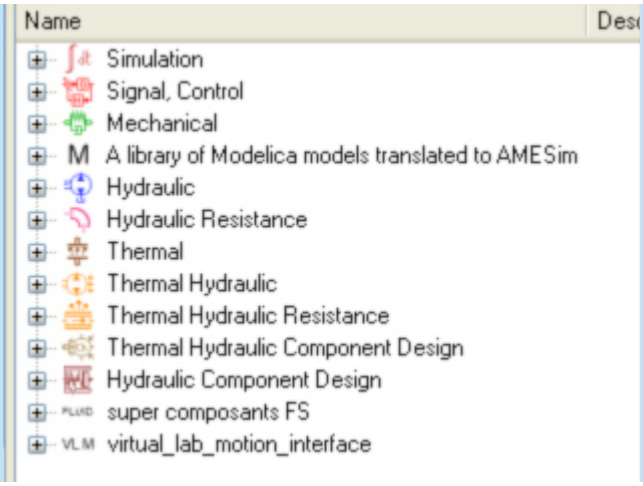
Part of a two-company design partnership, FLUID-SYSTEM is one of those innovative companies that fly under the radar. Its talented team of researchers work diligently to create hydraulic components for distribution, pressure and flow regulation. More often than not, the final FLUID-SYSTEM components must integrate seamlessly with the control units of embedded electronics found in modern-day agricultural, maintenance, industrial, marine and railway vehicles. This is why the team at FLUID-SYSTEM works closely with a partner company, DESIGN TRONIC, specialized in embedded electronic device design. They market their work under the name, FLUIDESIGN, a french company based in Lorette. And, like any OEM supplier these days, many of FLUIDESIGN's customers expect nothing less t han perfection when it comes to product performance.

So when the FLUID-SYSTEM R&D department ran into some dynamic stability issues on the test bench, they decided that they needed to conduct several studies on the flow regulation. Of course, they could do this the old-fashioned way with prototyping and research procedures, but the team just didn't have the time. They needed to find a tool that would point them directly in the right direction and shorten time-to-market substantially.

And that tool turned out to be LMS Imagine.Lab AMESim.

"LMS Imagine.Lab AMESim stood out amongst other competitors. The solution is really robust, technically precise and the various libraries are complete," stated Frederic Lagors, R&D engineer at FLUID-SYSTEM.

When the R&D team put the software through its paces, they were immediately reassured that the CEO made the right choice. Early in the development process, the clear-cut 1D models let the researchers try out a variety of technical choices to find the most feasible one. Another key feature was the software's ability to pre-empt product performance in terms of flow regulation and stability. From a practical design point-of-view, this meant that FLUDESIGN could determine the right trade-off balance between stability and performance parameters for its pressure relief valves – all during the concept stage without any back and forth between development teams. "Another plus point for LMS Imagine.Lab AMESim is that we could assess our product performance according to various customer environment scenarios. Since we have so many different customers, this really simplified our work, specifically in areas that required thermal evaluations or hose sizing," added Xavier Tardy, CEO of FLUID-SYSTEM.



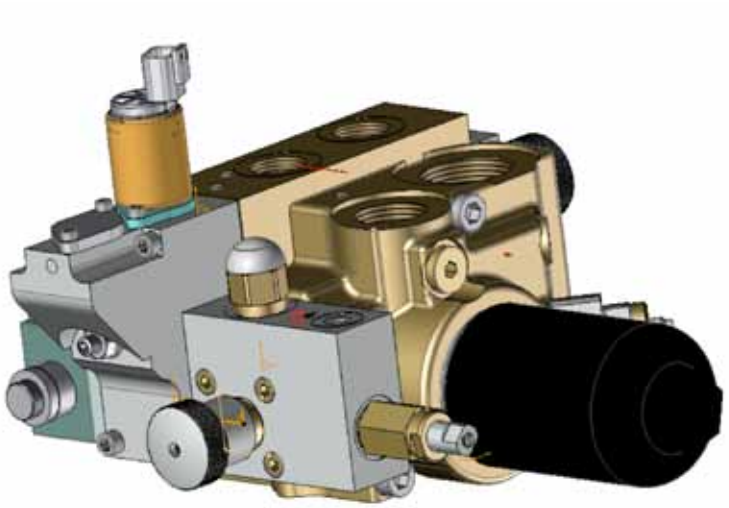
FLUID-SYSTEM uses various LMS Imagine.Lab hydraulic and thermal libraries and solutions. They also use a dedicated application to translate open-source Modelica models into the LMS Imagine.Lab AMESim platform. The total solution delivers the tools to design components and recreate systems affected by thermal hydraulics and resistance phenomena.

Finally, LMS Imagine.Lab AMESim supported the final production and quality check process by pre-determining the product's resistance and providing a tolerance sensitivity analysis for the main spool valves, taking underlap, pressure forces and flows into account.

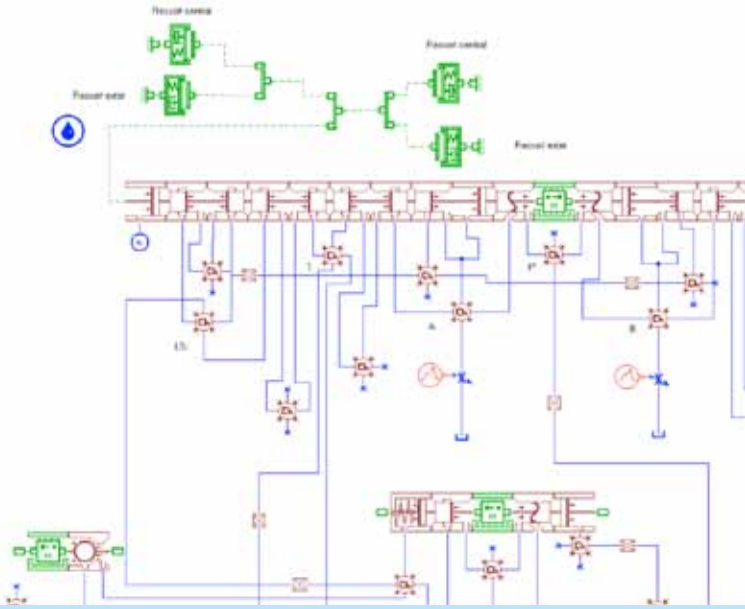
On the usability side, FLUID-SYSTEM's R&D department found that LMS Imagine.Lab was highly modular and could be easily integrated into the entire simulation process. Its intuitive and user-friendly interface could also handle input from other software like SolidWorks Flow Simulation CFD software to obtain better models of the pressure flows and hydrodynamic effects. For example, knowing the flow coefficients and flow forces in the main spool valves helped set better parameters in the LMS Imagine.Lab AMESim models. Only with this type of software collaboration could the team realistically simulate and understand the phenomena happening in the particular value shapes.

The resulting simulation was extremely scalable as well. The amount of data and input specifications only increase as the product development advanced. The FLUID-SYSTEM researchers could sketch a quick functional model during the early stages and develop it into a detailed, high frequency model for in-depth design analysis.

"Our investment in LMS Imagine.Lab AMESim has tangibly saved us time, money and needless efforts by highlighting potential issues before prototype creation. We now spend half the time on prototype adjustment. And we have certainly saved on product touch-ups and late-stage modifications," concluded Xavier Tardy. ■



A finished hydraulic component from FLUIDESIGN. The image denotes the specific flow-rate regulator that was correctly adjusted using LMS Imagine.Lab AMESim.



The actual LMS Imagine.Lab AMESim model of the main spool, integrating the CFD computation of the jet forces, connected to the LMS Imagine.Lab AMESim pressure valve model.

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