Partner Spotlight: Phoenix Integration

James W. Mullins, Vice President of Operations, discusses model-based engineering framework software, ModelCenter®, available through the Altair Partner Alliance.

APA: What prompted the development of your software?

James: In the early 1990s, two Virginia Tech Ph.D. candidates and a Virginia Tech professor (Dr. Brett Malone in Aerospace Engineering, Dr. Scott Woyak in Mechanical Engineering, and Mechanical Engineering Professor, Dr. Arvid Myklebust) worked together on a NASA-funded project called AirCraft SYNThesis (ACSYNT). As part of their work together, they collectively identified a significant bottleneck in organizations caused by the manual nature of connecting engineering disciplines, their disparate analysis tools, and the resultant manual workflows. This traditional way of doing things was error prone, inefficient, and could not be scaled to perform many executions of a workflow. They founded Phoenix Integration in 1995 to create a general-purpose integration and automation software tool, ModelCenter®, to provide a solution to this problem.

APA: What problem is ModelCenter® meant to solve and what are the benefits?

ModelCenter® Integrate increases productivity by enabling users to execute significantly more simulations with less time and resources. ModelCenter® Integrate allows users to automate any modeling and simulation tool from any vendor, integrate these tools together to create repeatable simulation workflows, set simulation parameters, and automatically execute the workflow.
ModelCenter® Explore drives innovation and improves product quality by enabling users to thoroughly explore and understand the design space, make better decisions, and find optimal solutions. ModelCenter® Explore allows users to run powerful algorithms and trade study tools; search, investigate, and understand the design space; incorporate multiple variables (cost, performance, risk); visualize results and the impact of design changes; and find optimum solutions.

MBSEPak enables Model Based Systems Engineering (MBSE) by integrating engineering models with SysML. MBSEPak provides an integrated modeling and analysis capability that bridges the gap between systems engineering and domain/disciplinary engineering. This integrated capability aims to streamline the system development process by enabling collaboration among design teams for defining, designing, optimizing, and validating complex engineering systems.

**APA: Are there any unique applications that ModelCenter® works for that your competition cannot?**

**James:** Only ModelCenter® with the MBSEPak offers a general capability for connecting engineering analysis directly to systems modeling tools such as SysML.

**APA: How much time does it take to learn and start using your software?**

**James:** The product is renowned for its ease of use, and after a short (1-2 day) introductory training session, most customers can do everything they need on their own.

**APA: What are the biggest challenges or problems that customers in your target market face and how do you address their needs?**

**James:** There are a couple significant challenges. First, our target customers are under extreme pressure to analyze...
more concepts, come up with better designs, and do it all in less and less time. Our customers are also faced with understanding the impacts of requirements changes on their systems design. ModelCenter® Integrate allows our target customers to automate all of the analysis into an automated workflow and eliminates the introduction of error caused by “human in the loop”. ModelCenter® Explore lets our target customers then exercise those automated workflows extremely efficiently, in some cases allowing them to evaluate hundreds or thousands of concepts in the same time that they used to evaluate five or ten. The close integration of ModelCenter® with systems engineering tools via MBSEPak then allows customers to respond efficiently as systems requirements evolve over the life of a project.

**APA: Describe a typical workflow of ModelCenter®.**

**James:** An example concept design may consist of geometry via a CAD tool, meshing via Altair’s HyperMesh, structural analysis via a Finite Element Analysis (FEA) tool, an aerodynamic analysis via a Computational Fluid Dynamics (CFD) tool, and a cost analysis via spreadsheets or scripts. ModelCenter® allows you to automate the execution, exposing the variables that you are interested in, and then allows you to link the variables together, creating a fully automated workflow. ModelCenter® takes care of all the data propagation and reformatting as appropriate. The user may then choose to run a study where they change one or more geometry variables for many runs and look at how that impacts the performance and cost of the design. The beauty of ModelCenter®, however, is that this workflow can consist of any combination of tools that is desired as long as it can run in batch mode.
APA: What’s next for ModelCenter®... what can we look forward to?

James: We will continue to enhance and refine our core capabilities. Find out more at our 2018 International Users’ Conference which will be held in Annapolis, MD on April 17-19, 2018.

Additionally, we will be at the NAFEMS Americas 2018 conference in Cleveland, OH on June 5-7, 2018.

For more information about ModelCenter®, visit the solution page.