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Success story

modeFRONTIER orchestrates system modeling at Whirlpool Corporation

modeFRONTIER helps Whirlpool Corporation create more consistent models by increasing fidelity and performance

Whirlpool Corporation is the **world leader in the appliances industry**, with 67 manufacturing and technology centers operating globally and strongly committed to maintaining its innovation-oriented strategy. Whirlpool has successfully devised a system of tools that enables the **ongoing connection and engagement** throughout the network of design teams worldwide. **modeFRONTIER** plays a key role in **streamlining system modeling** tasks and helps Whirlpool **rationalize the whole process** and adapt it **efficiently** to regional peculiarities, providing diversified product lines.

Challenge

Sophisticated appliance design is underpinned by **complex mechanical and electrical requirements and demands** advanced engineering knowledge in dynamics, structures, fluids, thermodynamics and controls. This calls for an **in-depth understanding** of both market expectations and engineering dynamics at system level. Most of all, the ability to **evaluate product performance** before identifying specific requirements accelerates the subsequent adaptation to regional peculiarities. **Connecting all players doing similar tasks** is crucial for identifying not just a single solution, but a set of solutions so as to **map out the relevant space** before laying down the requirements. **Balancing individual and team workloads** based on such flexible approach is challenging task which can be tackled only with **appropriate mindset and tools**.

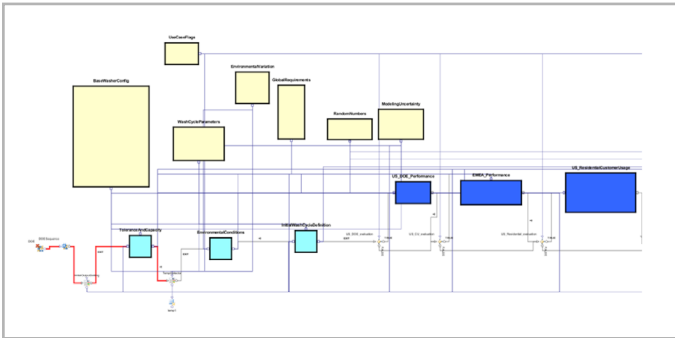
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modeFRONTIER is like a symphony conductor, pulling together the individual subsystem outputs.

Solution

System modeling as conceived by engineers at Whirlpool combines “**Attribute**” and “**Architecture**” performance together and relies upon **modeFRONTIER** as the **multidisciplinary project dashboard**: it “provides us with an **easy way to combine attribute models** – defining subsystems configurations - and evaluate product performance without specific requirements”, says **Greg Garstecki**

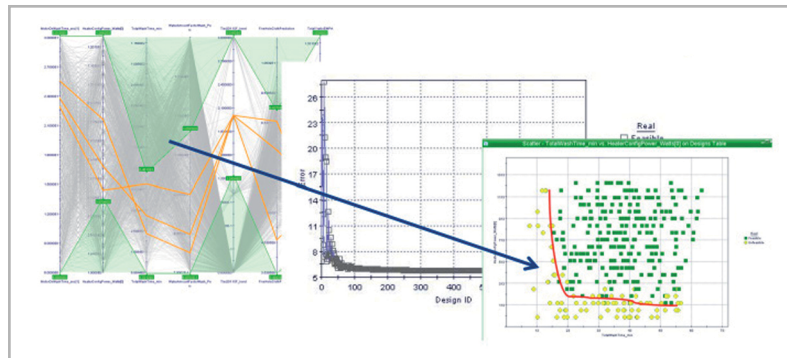
(Principal Engineer, Fabric Care Advanced Development at Whirlpool). This results in a “**correlation and calibration document**” described by **John Mannisto** (Engineering Director, Simulation Based Design at Whirlpool) as “a tool for measuring our confidence in a particular simulation, and for understanding the variations in our processes.” While the interrelated effects of the involved electro-mechanical simulation variables are **identified at an early stage**, **modeFRONTIER multi-objective optimization capabilities** allows us to reach a **high level of performance** once the product requirements are then set”, points out Garstecki.



Fabric Care System Model – High level view.

Benefits

Modeling product performance at system level is an **evolutionary process**, from the mere description of specific performance metrics by means of empirical test data to the physics-based predictive model. modeFRONTIER helps Whirlpool create **more consistent models by increasing fidelity and performance**: this in turn allows for a larger inference space for design and continuous connection at a system level to lay down the basis for knowledge capture. “**System modelling is where modeFRONTIER really shines**”, Mannisto added. “It’s like a symphony conductor, pulling together the individual subsystem outputs to understand the interplay between them. This lets us **explore and discover possibilities** we’ve never even considered.”



Optimization of product performance with clear requirements.

About Whirlpool Corporation

Whirlpool Corporation is the world’s leading global manufacturer and marketer of **major home appliances**, with annual sales of approximately \$19 B in 2013, 69,000 employees, and 59 manufacturing and technology **research centers** around the world. The company markets Whirlpool, Maytag, KitchenAid, Jenn-Air, Amana, Brastemp, Consul, Bauknecht and other major brand names. We earn the **trust of consumers** in nearly every country by focusing on what matters most. Focused on embedding innovation throughout it’s business, Whirlpool has made a long-standing investment to build this core competency. www.whirlpool.com



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