Honeywell

Honeywell Models GE Gas Turbine with VisSim

By Mohan Thiagarajah, applications consultant, Honeywell UK

When Honeywell UK won a contract to retrofit an existing control system on a General Electric LM2500 gas turbine, they required a simulation package that had the power and flexibility to model the nonlinearities of a turbine, as well as evaluate the relationship between the turbine and controller. Based on previous experience, Mohan Thiagarajah, applications consultant at Honeywell, chose VisSim to handle all of their development and testing needs.

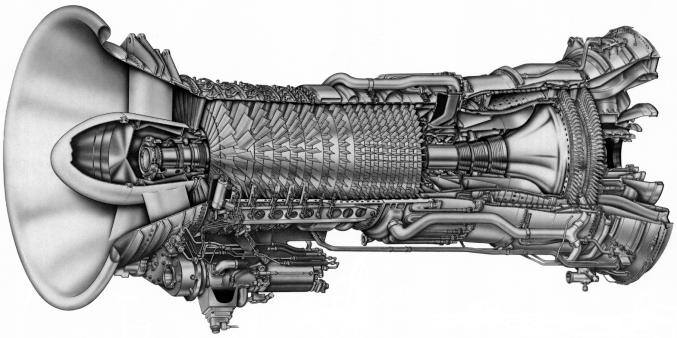
After only a few weeks, Thiagarajah created a basic model of the gas turbine, including the compressor, combustor, gas generator turbine, and power turbine. Several iterations later, the model would grow to over 2,000 blocks and encompass all the auxiliary units, including fans, pumps, values, and pipes. According to Thiagarajah, features like drag-and-drop block placement and compound blocks streamlined model construction and greatly improved the readability of the diagram.

One of Thiagarajah's prime concerns was integrating existing GE information into the overall model. In particular, Thiagarajah wanted to model the starter motor, ignition system, ventilation fan, and lubrication oil pumps based on GE specifications. "The map block provided an easy and reliable way to incorporate this data directly into the simulation," explained Thiagarajah. "I could perform 1-, 2-, or 3-D table look-ups, depending on how the data was organized."

With a fully functioning model, Thiagarajah was able to create and validate complicated control algorithms for start-up sequencing and fuel controls, and simulate both the transient and steady-state behavior of the system. He also had a safe environment in which to test emergency trips and alarms that would be too costly or dangerous to perform on the physical system.

In the end, both Honeywell and their customer were extremely satisfied with Thiagarajah's work. Honeywell found that VisSim was the most effective and easiest PC-based solution for developing complex simulation models. Honeywell's customer ended up with an operational system that met all their requirements.

"We have a similar project coming up soon — an offshore oil rig in Norway that has ten compressors and four Rolls Royce gas turbines. I fully expect to use VisSim to great effect again."



General Electric LM2500 gas generator.

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Application: Turbine Modeling and Control System Design