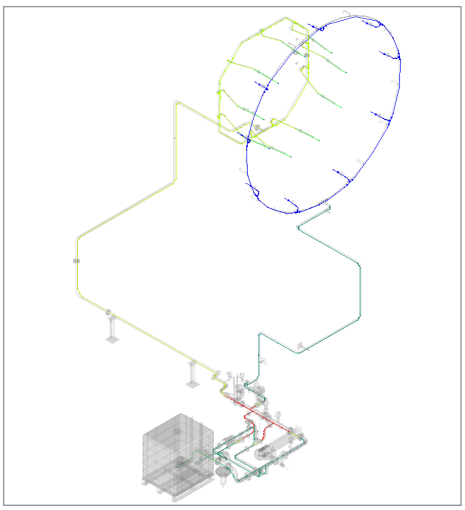
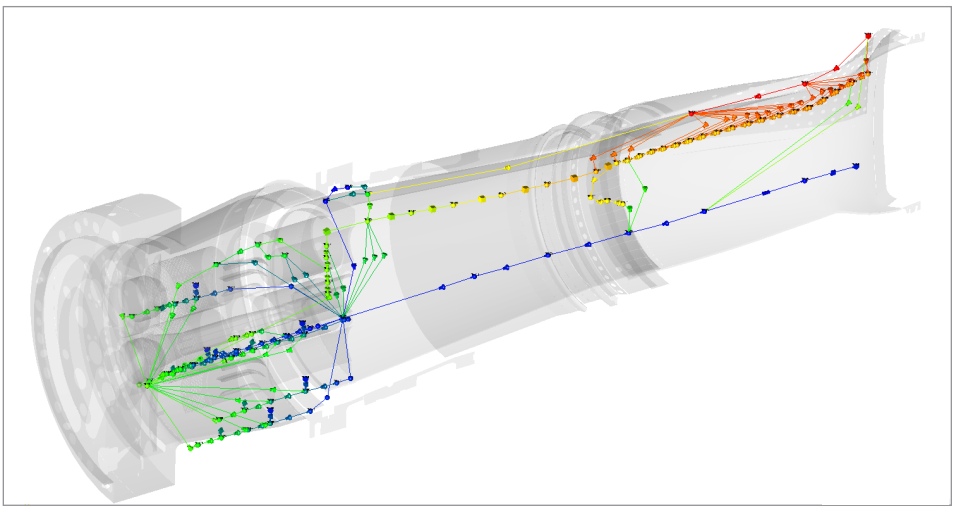
GE Power Sets World Records for Gas Turbine Combined Cycle Efficiency using Flow Simulator





Company Overview

GE Power is a world energy leader that provides technology, solutions and services across the entire energy value chain from the point of generation to consumption. We are transforming the electricity industry by uniting all the resources and scale of the world's first Digital Industrial company. Our customers operate in more than 150 countries, and together we power more than a third of the world to illuminate cities, build economies and connect the world.

Nothing speaks louder than World Records and GE Power holds the only two Guinness World Records for Gas Turbine combined cycle efficiency for 50Hz and 60Hz power generation plants in commercial operation. What makes these records possible is understanding where every molecule of cooling and leakage air goes in the engine. Low emissions of NOx also require this precision. In GE Power, we use the Flow Simulator tool to maintain this precise understanding. Based upon our internally developed 1-D network flow solver, Flow Simulator is our day-to-day workhorse for designing the secondary flow circuit within a gas turbine engine, its bearing system, combustion, and accessory systems. With it we understand the complex interactions of internal engine components during engine operations from cold start to shut down, spinning reserve to trip and hot restart. We use the flow circuitry to understand the transient thermal response of the engine and manage the clearances between rotating and stationary components to the width of a few human hairs. All of this is accomplished using the 1-dimensional flow network software Flow Simulator.

Transitioning secondary flow designers to Flow Simulator was easy thanks to its modern user interface. Branches in the flow circuit are presented on an engine cross-section instead of arbitrary points and elements in a 2D space. One of the greatest attributes of Flow Simulator is its solver speed. Designers can run full probabilistic analysis to understand every possible way customers can run their engines and the impact of manufacturing variation on pressures and flow rates ... all on their desktop workstation. Numerical stability of the solver is also a key attribute enabling a broader range of parameter exploration that its predecessor. Boundary condition mapping is also easy and accuracy is ensured using an extensive database of peer-reviewed correlations and the facility to incorporate specialized proprietary correlations. In a world where CFD seems the norm for fluid flow simulation, we use Flow Simulator to understand and track cooling and leakage air and its impact on gas turbine efficiency and emissions.

Keywords: GE, Altair Partner Alliance, Flow Simulator, GE Power, Gas Turbine, Engine

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