Jet engines are truly “Brilliant Machines.” Not only can they power a 200-ton airplane, but they can also produce enough electrical power to sustain nearly 80 million homes.

The team at GE Power & Water’s Aeroderivative Gas Turbines business sells the same gas turbine engines that GE Aviation supplies to aircraft manufacturers, to customers for energy production. Today, engines from GE Aeroderivative Gas Turbines with power outputs ranging from 20 to 100 MW, are used worldwide in a variety of applications including in the Oil & Gas industry to generate emergency power, to satisfy ongoing power needs for utilities, pipelines, offshore platforms, and on cruise ships. Currently GE Aeroderivative Gas Turbines has more than 200 turbine engines in use in 73 countries.

These “aeroderivative” solutions, turbine engines used in this capacity, run continuously at take-off speed and require careful monitoring to ensure maximum uptime and productivity. To help keep these engines running smoothly and efficiently at all times, GE Aeroderivative Gas Turbines provides a variety of after-market services to its customers that include remote monitoring and diagnostics (RM&D). When each aeroderivative turbine is shipped, GE Aeroderivative Gas Turbines equips it with hundreds of sensors that measure temperature, pressure, rotating speed, and energy output. This data is collected locally and then sent securely to GE Aeroderivative Gas Turbines’ experts who view pre-programmed analytics on a standard web browser. This cloud-based system is GE’s Proficy® Knowledge Center.

**RESULTS**

- Value differential of $7.5 million attributed to downtime avoidance, faster return to service, damage avoidance, and Operations & Maintenance improvements
- Customer realized fleet efficiency increase from 68% to 93% in just one year
- More than doubled the amount of customer “saves” with the same amount of staff in first year of operation
Performance is key

Prior to implementing Proficy Knowledge Center, GE Aeroderivative Gas Turbines had used 10-year-old custom software tools that ran on top of their legacy Oracle system. Updates to the system were no longer viable and the team wanted to increase the after-market monitoring services that they could offer their customers.

“It wasn’t a virtualized solution, nor was it scalable. We needed something that was automated and scalable to accommodate growth over the next few years,” said Joe Gollapalli, Knowledge Solutions Manager, for GE Power & Water Aeroderivative Gas Turbines. “We have more than 200 turbine engines that we actively service. Once we started monitoring 150 units the current infrastructure and processes were strained. We were having trouble providing consistent service to our customers in a timely manner.”

“What we needed was a better cloud-based tool that would allow us to optimize our entire fleet,” said Gollapalli.

This isn’t funny money

To be certain about their direction, Gollapalli and his team conducted a focus group and used Monopoly money to see just what the pain points were that the company could solve for their customers. Thirty customers were given $10 million dollars each—an IT dream budget. They were then instructed to spend/vote for capabilities that would significantly impact their bottom line. Out of the $300 million dollars, customers allocated $287 million this way:

$131M focused on increasing revenue and improving reliability and availability
$95M went to creating a better experience
$61M was allocated to reducing costs

“Voice of the customer” session takeaways

GE Aeroderivative Gas Turbines collected more than 1,800 points of data during the “voice of customer” session. The key takeaways from the session were:

1) Tell me the ‘health’ of my unit
2) Give me advance notice of equipment issues
3) Resolve issues remotely
4) Help me make proper maintenance decisions
5) Tell me how I am doing versus the fleet

The company re-evaluated current capabilities and how they aligned with what customers wanted. What came out was a clear action plan to rebuild the RM&D infrastructure, develop more connectivity options to expand the fleet the company monitors, invest in programs to develop predictive analytics, and invest in the right process and personnel to follow through on actions with customers.

A cross functional team from Engineering, IT, Intelligent Platforms, commercial and product-line personnel was assembled to help execute on these programs. Three pilot customers were recruited to make sure the program stayed on track.

“It’s important for us to understand how an engine will perform in the field, and it’s important to keep our customers’ operations going. Cloud-based RM&D analytics allow us to minimize engine downtime for our customers and maximize efficiency.”

Joe Gollapalli
Knowledge Solutions Manager
GE Power & Water
Aeroderivative Gas Turbines
GE Aeroderivative Gas Turbines “saves” customer assets with Industrial Internet tool that works

Analytics provides value
To meet the needs of their customers, GE Aeroderivative Gas Turbines selected Proficy’s Knowledge Center, model-driven, web-based visualization environment, which provides timely asset information management functions such as current equipment status, historical trending, and reporting. Users can view fleet statistics; create and save analysis sessions, and view analytical alarm data. Tightly coupling an asset data model with near real-time visualization and historical trending, Knowledge Center displays actionable information in a timely and collaborative fashion, leading to higher productivity and faster decisions.

Knowledge Center builds on Proficy Historian, to efficiently store immense amounts of low and high-speed time-series data, a solution which has saved other customers millions by optimizing data storage costs. This data is processed through a Proficy CSense analytic rules engine and visualized through the Knowledge Center browser, which can be viewed from anywhere, but primarily from the GE Aeroderivative Gas Turbines monitoring center in Houston, TX.

“This was a real paradigm shift for GE Aeroderivative Gas Turbines. People can be more productive because they can focus on solving the problem—not just trying to access the data.”

Joe Gollapalli
Knowledge Solutions Manager
GE Power & Water
Aeroderivative Gas Turbines

The analytics features of Knowledge Center allows GE Aeroderivative Gas Turbines to pinpoint causes of performance variation, optimize processes, and enhance asset performance, while minimizing capital investment. Alerts and anomalies detected by the solution are sent, viewed, acknowledged and cleared as events in the data store. Advisories are visualized to guide a subject matter expert on the next steps to take to improve equipment performance and health.

Through a simple and clean user interface, teams are able to do real-time modeling, look at historical data and see how an engine is trending. From a LMS100 engine, for example, GE can look across 1,200 operating parameters, alarms and diagnostics files to gauge performance and reliability. One turbine’s data can easily be compared to another in a side-by-side peer review. Due to the performance and ease of use of the Proficy Knowledge Center system, GE Aeroderivative Gas Turbines experts became more efficient in identifying and solving issues. In 2012, the first year of operation with Knowledge Center, they more than doubled the amount of customer “saves” with the same amount of staff.

“It’s one thing to build a tool, it’s another to have one that works,” said Gollapalli.

The value to GE customers was immediate – with machines up and running longer customers’ revenues increased, while repair costs decreased. “That’s a value differential of $7.5 million attributed to downtime avoidance, faster return to service, damage avoidance, and Operations & Maintenance (O&M) improvements,” says Gollapalli.

This kind of value-add was exactly what GE’s customers wanted: One customer who moved to GE Aeroderivative Gas Turbines from self-monitoring saw reliability increase in its fleet from 68% to 93% in just one year.

With customer successes such as this, GE Aeroderivative Gas Turbines is now monitoring 340 turbines, with a goal of 900. “Our customer value is our expertise,” said Gollapalli. “The solution provides a way for us to apply our expertise to hundreds of machines operating across the world in real-time. This will result in positive outcomes for our customers.”
GE Intelligent Platforms Contact Information

Americas: 1 800 322 3616 or 1 434 978 5100. Global regional phone numbers are available on our web site. Global regional phone numbers are available on our web site.

www.ge-ip.com