CyberMetrix has expanded its capabilities in test services with the opening of its climate center at one of its two Columbus, Ind., facilities. The climate center incorporates a pair of large test chambers that can accommodate engines up to 2000 hp — 4000 hp when opened into a single chamber — as well as buses, trucks and off-highway vehicles.

PASSING THE TESTS

Expanded facility with climate center highlights global growth of test cell specialist CyberMetrix

When a startup company finds success, it often won't stray too far from what it was that put it on the map. In other instances, entrepreneurs begin in one area but eventually push far beyond what might have originally been envisioned.

A good example of the latter approach is the company CyberMetrix. Founded 23 years ago by Christine Mullholand, who earlier held managerial positions in engineering and manufacturing at Cummins Inc., the company started out as a developer of software for data acquisition, control of engines and mobile testing systems.

Later, while continuing to refine its programming expertise, CyberMetrix expanded into the development and delivery of prepackaged, modular turnkey test systems for vehicles and equipment. More recently, it has added complete engine, component and vehicle testing services, highlighted by a climate center installed in one of the company's two Columbus, Ind., facilities. In parallel with the local expansion, the company has expanded globally and added additional U.S. sites.

This expansion leaves CyberMetrix in position to provide a total range of test cell solutions, from extremely flexible testing software and solutions to facility planning and testing services surrounding the development, verification, certification or troubleshooting of engines, components, machines and vehicles.

"When we started CyberMetrix in 1992, our focus was data acquisition and control technology," said Mullholand, CEO of the privately held company. "We grew steadily. Then, we had a really difficult time in 2000 and 2001, when we thought we could develop software outside our field of expertise — boy, did we learn a tough lesson.

"After a couple of years and a major economic downturn, we backed out of 'all things software' and focused on what we were good at — testing solutions. We've been profitable and growing ever since. As David Bartels, our VP of Program Management, likes to say, 'We are test cell people, from planning to results, from building cells to providing testing services.'"

CyberMetrix has more than 600 test system applications in place around the world, Mullholand said, including a modular power generation test cell that is being prepared for shipment to Nigeria. "What keeps us on our toes is working with the customer to define

Along with the large climate cells, the CyberMetrix climate center includes a range of other testing systems, including natural gas and diesel dynamometers, cold and freezing chambers, altitude benches, thermal chambers, industrial ovens, SCR doser test stands and fuel contamination rigs.

their needs then integrating the right solution to meet those needs," she said. "The intelligence of the test cell is the test system. If the test system is limited, so are the solutions."

That intelligence is provided by the company's proprietary CyFlex software, an advanced real-time data acquisition and control system environment designed to provide a simple graphical user interface that can be configured to suit operator requirements. It is adaptable to an extensive range of test and measurement applications, CyberMetrix said, ranging from simple tests managing a handful of parameters to complex tests involving hundreds of real-time measurements, along with control of any number of parameters and subsystems.

"Our technology is meant to empower the engineers so they can have one technology that can handle many different types of test applications," Mullholand said. "When we write the device drivers, we believe that engineers are best served if they look at best-in-class components. You might want to use a smoke meter from one supplier, a dynamometer from another and an emissions bench from a third. In CyFlex, we have a flexible system that can interface with the best that's on the market."

At the same time, it's versatile enough so that it doesn't lock anyone into particular components, Bartels said. "We work with both regional and global suppliers — including in Europe, China and India — to determine who has the best tool for the job," he said. "Best value means first understanding the customer's needs and then integrating proven components with one goal in mind — consistent data integrity at a fair price backed by a team that will be around to help you make it all work. We find that customers who focus on the needs and not on the brand have test facilities that are the most productive and have the lowest total cost of ownership."

Beyond developing software and systems to gather data, CyberMetrix has worked at creating new ways to turn that data into useful information — a process that is often complicated by the fact that results are typically accumulated in different formats, from spreadsheets to scientific visualization, all of which can yield different results.

In an effort to help turn masses of performance measurements into actionable data, the company recently engineered a new post-test analysis program designed to condense volumes of data into usable information. Mach Engine Analytics will have its first release to the general market in the first quarter of 2016.

"Mach Engine Analytics has been developed to support analysis of test results for complex product using a modular and flexible architecture," said Bruce Thomason, chief technical officer at CyberMetrix. "Mach can be tailored to fit the end-using IT and engineering environments, including data storage, the OEM's (original equipment manufacturer's) proprietary analytical methods and naming conventions, units of measure and other factors.

"Mach software, which has only recently become available, can apply measurement uncertainty to complex multistage analysis results and is an enterprise solution with friendly enterprise licensing provisions and support."

CyberMetrix combines its control and data acquisition know-how with its understanding of test cell technology in its system packaging and facility projects.

"We have a lot of expertise in complex, high-end test cells," Bartels said. "We can help engineers develop and clearly document their requirements and then help them navigate the supply chain to get the best value. We also can manage the entire project process for them — be the aggregator or project manager, including overseeing the hiring of a construction company, if needed, and working with suppliers.

"Program management means understanding the requirements first — something our people are very good at based on their history with testing — and then filling those requirements, regardless of the project model or the supply chain.

"On that side of the business, we

mainly manage and integrate, but we have had times when there were things we couldn't find, or the customer needed something better, so we developed our own."

Examples of that in-house development capability are the CyberMetrix fuel subsystem and Cyrius IO electronics package.

The fuel subsystem is designed to offer a comprehensive and cost-effective solution for fuel temperature conditioning and wide-range mass flow measurement. Able to operate either as part of a complete system or stand-alone, the CyberMetrix fuel subsystem is fully scalable for small or large engines and can measure and condition fuel within very tight tolerances, CyberMetrix said.

The Cyrius IO provides data acquisition electronics in a packaged form to measure engine and related physical parameters using external sensors and control environmental boundary conditions for engine testing through external actuators. Highly flexible, it allows for easy installation of eight-, 16- or 32-channel groups, allowing users to deploy exactly the I/O functionality needed on a just-in-time basis, the company said.

On the testing services side, CyberMetrix maintains two facilities in its Columbus home, including a 100,000 sq.ft. facility that it acquired in 2013. Since then, much of the time has been spent renovating and upgrading the site to include new test cells and a climate center that the company said can provide "conveniently bad weather all year long."

"We wanted to expand into more specialized types of testing," Mullholand said. "We got a contract that if we built this facility and had it up and running in six months, we would have it full for a couple of years. We did that — we got the contract in December and it was up and running in May — which was pretty good. And bookings are strong.

"The facility is what put us on the map. The fact that we could do something of this magnitude and complexity — and within budget and built in six months — has put us on the global map as much as our technology has."

CyberMetrix offers a range of testing services for all types of engines and engine-powered machinery, including production testing of power generation equipment.

The climate center incorporates a pair of large test chambers — measuring 40 x 60 x 20 ft. — that can accommodate engines up to 2000 hp — 4000 hp when opened into a single chamber — as well as light- and heavy-duty vehicles and off-highway equipment. The chambers can generate ambient temperatures from -35° to 100°F and provide a platform for a range of testing procedures, including cold starting and cold mechanical development, thermal performance profiling, hot and cold thermal modeling verification, cold procedure development and thermal protection and enhancement testing.

"We've tested big engines used in railroads, under load, at -20°F," Mullholand said. "We can put two buses in there or four pickups at a time. We've also had a huge Kawasaki loader in there."

Along with the large climate cells, the site includes natural gas and diesel dynamometer cells, additional 1000 cu.ft. cold chambers and two freezer containers for component testing, two thermal altitude benches and three thermal chambers, industrial ovens, selective catalytic reduction(SCR) doser test stands and fuel contamination rigs.

"We can control the test environment however we need to in order to do whatever test we need to do," Mullholand said. "That can get pretty complicated, but with this facility, we can do it precisely."

At the same time it was expanding locally, CyberMetrix was also growing elsewhere. It established two additional U.S. locations — in Verona, Wis., near Madison, and in Detroit, Mich. "We're also looking into an office in the Carolinas," Mullholand said.

CyberMetrix has also founded operations in the U.K., in Bedford, north of London, and a wholly owned subsidiary in Pune, India. "And we have a lot of opportunities in China," Mullholand said. "We've been going to China since 2005, talking to people. I've had people wanting to give me their dynamometer company because they saw the writing on the wall — if you don't have the technology, you're in trouble — and our technology is what's attracting everybody from U.S. manufacturers that are there to Chinese engine companies. We're still looking to determine what our best opportunities are there." dp

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