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Meet EDSA, a little firm poised to compete for smart grid accounts

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Military contracts steered firm to energy management

A small software firm in San Diego aims to be a big name in creating microgrids -- the semi-independent power-generating communities that power luminary Kurt Yeager has called the most important step toward a smart grid.

Privately held EDSA, with a staff of 30, has developed software called Paladin SmartGrid that is about to see its first use -- by the University of California at San Diego (UCSD). There, starting this summer, Paladin SmartGrid will serve as a "master controller," letting the campus monitor and control its own generation sources while also using power from SDG&E as needed (SGT, Mar-01).

Microgrids are "effectively a new power plant source for the bulk power grid," Yeager said at a June presentation (SGT, Jun-12). A microgrid "in effect takes the dumb energy, which was adequate to manage our economy back in the middle of the 20th century, and brings its quality and reliability up to 21st century, digital standards." Microgrids can be seen as "an alternative vision to a highly integrated 'Super Grid,'" wrote Pike Research in a recent study.

EDSA, which originally stood for Electrical Design Simulation & Analysis, was started as a Michigan family business in the mid-'80s, CTO Kevin Meagher told us in an interview last week. Its software, designed as a supplement to its consulting business, analyzed short circuits.

That fairly prosaic product over the years was supplemented by Paladin DesignBase, an aid to designing power systems used in critically important sites such as data centers, pharmaceutical manufacturing plants, nuclear plants and oil and gas refineries. The US Navy and all the NATO navies have standardized on DesignBase and about 10,000 people are licensed to use it.

The firm had a growth spurt two years ago when former minority investor Wexford Capital, of Greenwich, Conn, increased its investment and brought in a team of professional managers. Wexford set out to "migrate the company from a start-up mentality to a growth-stage small company with a proven product," Wexford's Mark Mills told us via email yesterday. One objective, he said, was to "expand into the most logical complementary markets, especially the smart grid."

Two software products flowed from DesignBase. One, called Paladin Live, matches an electrical network's performance against its design, as generated by DesignBase. It assesses the network's reliability, availability, capacity and configurability on a continuing basis. The second, called Paladin SmartGrid, builds on Live, adding integration with market-optimization software.

"Viridity might say, 'For the next 24 hours, you should get 50% of your energy from your combined heat and power, 20% from your on-site natural gas generators and the rest from the utility,'" Meagher said. "Then we run a power-flow analysis every 30 minutes to see whether the recommendation will actually work. If not, we feed the data back to Viridity and it creates a new schedule. Because we can monitor the entire microgrid, we can optimize based on very accurate empirical data."

Paladin Live was conceived during 2003 discussions with the US Navy, Meagher said. "The Office of Naval Research is congressionally mandated to build ships with fight-through capability," Meagher said. "Ships have to be able to predict whether if they are about to take a missile on their port side, they'll be able to get one more shot off from the starboard side. They asked whether our DesignBase product could be transformed from a product that designed systems to one that monitored them in real time."

The Navy lost funding for the class of ships that were to be equipped with Paladin Live, Meagher said. But it is in use at about 50 sites, including data centers and half the FAA's US air traffic control centers, with all 26 centers scheduled to use it by year-end, he added.

Paladin Live processes data received from a requisite data-acquisition system or building-management system, providing a real-time view of whether every piece of a power network is performing as it was designed to. It provides a "very, very granular" look at voltage, frequency, current and power factor, helping the operator ensure performance to specifications.

EDSA is installing Paladin Live at a Utah data center being built by EBay and at a Visa data center in Herndon, Va.

Paladin Smart Grid came into being when EPRI, Enernex and UCSD were planning UCSD's microgrid, Meagher said. They were seeking a "master controller": software to manage a microgrid's own power sources and its integration into the larger grid.

"An engineer from EPRI had seen what we do at data centers and said, 'They don't call this a master controller, but if you look at the specification, it does everything we want it to and it already exists,'" Meagher said. "We think 'microgrid' and 'master controller' are synonymous terms."

It works with Viridity

The only current installation of Paladin SmartGrid, at UCSD, is integrated with VPower from Viridity Energy of Conshohocken, Pa. VPower receives and processes market-price signals, weather forecasts and the availability of resources. Viridity is "by far the best" at market optimization, Meagher said, but Paladin SmartGrid can be integrated with other vendors' market-optimization software too.

Paladin SmartGrid helps managers decide the most effective, lowest-cost power source at any given instant. Since the grid is constantly changing, the software analyzes it continuously to optimize based on the changing conditions.

The market-optimization component provides a 24-hour forecast of which power sources -- internal or on the larger grid -- would be the best choice, based on expected load, fuel costs and weather. Paladin SmartGrid helps the manager implement those choices and make adjustments if the forecast turns out to be inaccurate.

US market is big

Paladin SmartGrid ranges in cost from $20,000 to "a couple of million dollars," depending on a microgrid's size and complexity, Meagher said. EDSA has roughly 25 patents issued or pending on its software, most of them on the Paladin Live and Paladin SmartGrid products.

EDSA sees a large market for microgrids and Paladin SmartGrid in the thousands of data centers in the US. "They already have the infrastructure, the requirement for high-availability power and the concerns about energy management and the carbon footprint," Meagher said.

The US Army and Navy are eyeing microgrids for domestic bases, eventually planning to establish them overseas. North Carolina's Fort Bragg might be the next US site to create a microgrid as UCSD has done and EDSA is in talks with the Universities of Illinois, New Mexico and Texas.

The firm's biggest challenge is getting its name out and assuring eager but wary prospective customers to take a chance on a smaller firm, Meagher said.

"We have a huge amount of interest but a lot of customers like buying products from Siemens or GE," he said. "They get nervous about buying something from a little EDSA, so you have to be very unique in what you provide." Big reference accounts such as Visa and EBay help too, he added.

EDSA's revenue was under $10 million in 2009, Meagher said, and the firm hit break-even but is not yet profitable. Its principal competitor in data centers is Schneider Electric's Square D division, he noted.

His firm's management team boasts some major talent including CEO Mark Ascolese, former president of Powerware (formerly Exide Electronics Group), that posted revenue of $775 million in 2004 -- the year it was bought for $560 million by Eaton. Noted academician Silviu Darie serves as VP of consulting and engineering and is one of seven PhDs on staff.

"Right now our market share of microgrids is minuscule," Meagher said. "The high-end power quality market is about $8 billion and we have less than 2% of that. But there are huge opportunities and we expect to make some significant inroads."