Brookstone Equipment Company

Opto 22-Nokia Machine-to-Machine Technology Enables Monitoring of Remote Generators for Field Service Optimization

Brookstone Equipment Company is a highly respected provider of construction machinery and services. Established in 1999, the Orange County, California-based company is heavily involved in the development of residential, commercial and industrial projects across the southwestern United States. As part of these endeavors, Brookstone rents a broad assortment of heavy equipment such as aerial booms, hydraulic lifts, tractors, and a collection of backup generators with varying power capacities. Brookstone customers include owners and operators of cellular tower sites, convenience stores, utilities, along with a number of large contractors.

In efforts to better maintain its inventory of generators and improve its overall asset management capabilities, Brookstone sought to remotely monitor its generators on-site at customer locations. Brookstone imagined a system that would allow it to easily supervise and control these generators, allowing the company to better protect its investment in this equipment, which cost upwards of $50,000 dollars per unit. More importantly, however, Brookstone surmised that an inexpensive, easily implemented, and effective remote monitoring system would allow the company to better service its customers by enabling it to offer an enhanced maintenance/service package for its generators. Brookstone concluded that it could better its relationship with customers through an ability to offer value-added services such as quality-of-service (QOS) reports and preventive maintenance dispatch, while simultaneously creating a new revenue source for itself. "It was clearly a win-win situation," states Brookstone president Art Nelson. "Provided, of course, we could find and implement the right system." Turns out, that system was right in Brookstone's own backyard.

In Temecula, California—less than an hour's drive from Brookstone Equipment Rental headquarters—is Opto 22. Brookstone looked to this established manufacturer, and its line of remote monitoring, control, and data acquisition hardware, for a solution. Opto 22 immediately took possession of a Brookstone generator and began developing a prototype remote monitoring and control system for it. Opto 22 engineers worked with Brookstone personnel to determine the specific generator conditions that needed to be monitored. These included on/off

Figure 1: A Brookstone Equipment Company Generator

status along with fuel level, oil pressure, temperature, battery voltage, and overall power consumption. Brookstone knew that monitoring this last parameter was especially important. As Nelson explains, "All of our generators have individual power capacities that should not be exceeded. Sometimes though, customers will unknowingly operate a generator over its recommended power limits. This can severely damage the equipment and eventually shorten its lifecycle. By monitoring generator power consumption, we knew we could reduce these occurrences by establishing a policy of contacting customers and upgrading them to a more powerful generator when needed." Ultimately, this strategy would work in the best interest of both parties. The customer would get the power it required and eliminate the risk of an overworked generator failing, while Brookstone could protect its assets by reducing the risk of damage to its valuable equipment.

For Opto 22, providing a system that could do this type of comprehensive monitoring was the easy part. "We have 29 years of experience developing hardware for machine communication," says Opto 22 engineer, Ron Schmidt. "We knew that our flagship SNAP Ultimate I/O system had the intelligence to interface with the

Figure 2: Control and Monitoring Guages Inside the Generator Housing

Brookstone generators and do all the required monitoring and more. The challenging part was going to be the communications which, due to the remote locations, would have to be wireless."

Designing a system for monitoring and controlling assets in remote locations can be tricky. A variety of communications options have to be considered on an application specific basis. Solutions involving wireless LAN technology, dial-up modems, private radio networks, and even satellite communication all have their individual pros and cons. But halfway through the development of the Brookstone solution, Opto 22 entered an agreement with mobile communications giant Nokia to develop a machine-to-machine (M2M) practice focused on making it easier to wirelessly connect to, monitor, control, and gather real-time operational data from remote business equipment and machinery. In allying with Nokia, Opto 22 now had a standard, reliable and cost-effective method of communication for its remote applications and Brookstone was about to reap the benefits.

In slightly less than 90 days, Schmidt, together with Opto 22 application engineer Rene Gamero, had integrated Nokia's machine-to-machine technology with the SNAP Ultimate I/O system to create a comprehensive remote monitoring and control system for the first Brookstone generator. The designed system consisted of an intelligent device that fits conveniently right inside the generator housing and connects to its various components via multiple input/output points. Through an embedded wireless connectivity terminal transmitting over a GSM cellular network, the system is able to communicate directly to a Brookstone headquarters' Microsoft SQL application—populating those databases with accurate readings and measurements from the generator—in real time.

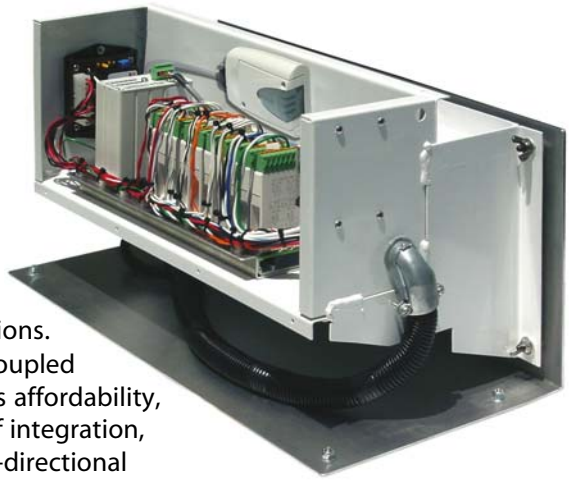
Opto 22 quickly installed similar systems on six Brookstone generators at customer sites in southern California and Arizona. Brookstone's IT department designed a custom web interface for the SQL databases that contain the generator data. Using any PC or mobile device, Brookstone customers use personal log-ins and passwords to access customized web pages and view data pertaining

to their generators. They are also able to send commands to remotely start or warm up the equipment. According to Brookstone Director of IT Victoria Dickens, who oversaw the development of this asset management web portal, "Customers see real value in being so well connected to these assets that they can get information and exercise control any time they wish. It's definitely increased their comfort level with the company."

From Brookstone's perspective, management is confident that its new Opto 22-Nokia system will positively alter the company's existing business model—optimizing the productivity of the company's service organization and creating a new revenue stream without having to hire additional employees. "We fully expect this machine-to-machine system to provide substantial ROI for the company by enabling us to offer new service packages for the monitored equipment, says Nelson. We anticipate the timeframe for this will be very short—probably somewhere around 60 days."

The new proactive generator monitoring has allowed Brookstone to eliminate the maintenance calls it was typically performing once a week. Instead, the company uses its asset management web portal to generate reports (based on real-time data) that indicate exactly when equipment needs servicing and schedules accordingly. "This is already resulting in a decrease in our service rollouts by 80 percent," Nelson attests. "That's a significant savings which translates into added income."

As it happens, when Brookstone first began sourcing a remote monitoring system for its generators, it first looked to the vendor. "We approached the generator manufacturer and it turns out they did offer a monitoring solution," says Matt DuBois, IT Administrator at Brookstone. "Unfortunately, it was basically just a digital-based alarming system, meaning we could get on/off warnings and not much else. Also, it was not bi-directional, so there was no way to exercise remote control when needed." Nelson adds that this system was also more expensive. The Opto 22-Nokia system, on the other hand, gave Brookstone the flexibility to send and receive a mix of digital and analog signals for monitoring and controlling both on/off and variable generator



conditions. This, coupled with its affordability, ease of integration, and bi-directional communication capabilities made the Opto 22-Nokia solution clearly superior.

Moving forward, Brookstone is in the process of outfitting more than 100 of its generators with the new system and is considering monitoring other types of equipment. "One of the great things about our M2M hardware is its flexibilty," explains Schmidt. "Right now, Brookstone is using it to monitor and control generators, but the system has the ability to connect to virtually any type of mechanical, electrical, or electronic machine. So there's no reason it can't be used for tractors, lifts, or anything else."

About Opto 22

Opto 22 manufactures and develops hardware and software products for applications in industrial automation, remote monitoring, and enterprise data acquisition. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's SNAP systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, or electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel. Founded in 1974 and with over 80 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability. Opto 22 products are sold through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-OPTO or visit our Web site at www.opto22.com.