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INTELEC Bridges The Telecom And Energy Worlds

by Kevin Parmenter, Contributor, How2Power Today

Exploring this year's International Telecommunications Energy Conference, I discovered just how much the telecom power industry has changed. According to exhibitors and other attendees I encountered at INTELEC 2012, which was held Sept. 30-Oct. 4 in Scottsdale, Arizona, telecom power used to be about ac-dc rectifiers and batteries that were installed in the phone companies' central offices to power a network built to deliver plain old telephone service (POTS).

But telecommunications is much different and broader today. The field encompasses both wired and wireless voice, data, and video communications. More importantly, the infrastructure built to carry out these communications is frequently in remote locations without access to the power grid or in countries where the grid is unstable. Despite these varied and challenging conditions, telecom and datacom systems are expected to maintain five nines reliability. To keep these mission critical systems up and running, telecom power must now encompass a variety of energy- and power-related technologies and INTELEC 2012's exhibition, conference program, and audience reflect this reality.

The approximately 500 attendees present at this year's event represented a wide range of companies including members of the battery and battery charging electronics industries. The battery test and monitoring industry were also represented in the exhibits as were merchant power system suppliers.

INTELEC 2012 drew approximately 500 attendees to its venue in Scottsdale, Ariz., where exhibitors showed a wide range of telecom power-related products. Photos courtesy of INTELEC and GE Power Electronics.

Naturally, these same industries were also represented among the approximately 50 booths in the INTELEC exhibit. However, this exhibit included a wide range of organizations promoting a host of products and services to serve the industry. So in addition to the suppliers of the battery, charger, test, monitoring, and power supply equipment, there were also vendors displaying other types of products.

Connectors and high-current distribution-enablement products from companies such as Burndy were on display and demonstrated. Also present were demonstrations and displays of fuel cells, hydrogen generators and conventional generators, and hybrid power systems for backup of mission critical applications for cellular infrastructure, data communications and telecommunications systems.

This theme of backup power, which ran thoughout the exhibit, reflects the reality that telecommunications systems, data-communications systems and wireless are growing most rapidly in regions with no grid or an unreliable grid that can experience random and often sustained power outages. So to power these systems, sites must have multiple options, which can include solar, batteries, wind, fuel cells, grid-tied and generator-powered power sources. Moreover, the control systems and power electronics much be adept at switching seamlessly among these different power sources while managing the battery storage when power is available.

Naturally, since batteries are at the heart of these systems, the exhibit presents a forum for showcasing battery developments. For example, A123 Systems, which has been in the news lately because of its restructuring, was

on-hand to discuss its Li-ion battery technology, which allows the batteries to be charged faster and cycle more without degradation. This capability gives telecom power system engineers more flexibility and allows the conventional generator to run less, thus cutting costs for fuel delivery and consumption in general. In some cases, this improved battery performance can reduce generator run time to emergency use only.

New technology and products were not the only developments showcased in the exhibit. Some vendors took the opportunity to present new services. A case in point is GE Power Electronics, (formally Lineage power and prior to that, Tyco Electronics). This provider of power systems and services announced innovative leasing and financing options for customers who are also being offered support and financial modeling to assist with decisions on different aspects of telecommunications power. These services will support the replacement of aging power systems with newer, more-efficient products, upgrading and leasing-financing to support different budget requirements such as ROI, payback period, energy cost savings and potential rebates. These services are offered for complete system-level site power systems.

For example, a customer may want to consider replacing aging (but operational) ferroresonant power conversion systems. These old systems are noisy, generate heat and are relatively inefficient. They also consume space and typically have a poor power factor when used with newer telecom equipment. The financing options encourage replacement of the ferroresonant power systems with new switch-mode power suppies, which results in savings in direct energy costs including the HVAC costs incurred in removal of heat. The utility savings, which include potential rebates, together with the financing and leasing options can offer dollars to the bottom-line efficiency and profits.

This is a very interesting model that GE has applied successfully to other industries such as aircraft engines (commonly called power by the hour), water processing and utility systems, locomotives and medical equipment. In offering leasing and financing to telecom power customers, the company leverages their substantial knowledge and expertise, not only in technology, but also in finance to help their customers achieve success.

The concern with the end customers' energy costs and their requirements for reliability suggests the need for interconnectivity between telecom systems and the power grid. With the emergence of the smart grid, it would seem that we're heading toward an interdependency between telecom systems, on the one hand, and the energy delivery systems (with their metering and intelligence) on the other. One possible outcome is that the telecom system will be able to respond to changes in the grid preemptively and proactively in a seamless manner without human intervention. Conversely, if something needs attention at the remote telecom site, a service person will be alerted and simply show up with replacement parts before they are needed or if a redundant system has taken over.

In practice, the individual sections of the systems—battery chargers and management already have intelligence in them. Therefore, these functions can be connected to other parts of the system at a telecom installation. So it makes sense that, as the smart grid is deployed, interaction between the grid and the telecom power systems will occur. This assumes that networking security can be insured such that hackers are kept out and prevented from tampering with infrastructure.

In fact, once the grid and telecom networks become more interconnected and interdependent, protecting the telecom infrastructure against tampering becomes a matter of homeland security, since terrorists would find these systems an attractive hacking target. And while anti-tampering measures will be needed to guard telecom sites against hacking (which is typically done remotely), the telecom installations will need to be physically secure as well. Put another way, the telecom sites will have to be able to resist manmade and natural disasters of all kinds in order to protect both the telecom networks and the power grids.

Many of the concepts mentioned above were the subject of talks in the conference portion of the program. The paper sessions were well attended with a variety of papers—almost 90 papers in all—covering topics from power electronics design to digital power control to battery developments and testing & monitoring of battery systems. The latter area is particularly necessary to insure that when the batteries are called upon they have not turned into 10-µF capacitors, which is something you don't want to discover when you start to draw current from them. These battery monitoring systems allow service units to be dispatched preventatively to maintain cells proactively and prevent fires and overloads due to defective batteries.

In attending the conference portion of INTELEC, I focused mainly on those sessions dealing with ac-dc conversion. These included a wide variety of very well done presentations of topical relevance. However, there were papers covering many other topics such as inverters, battery systems, power conversion, management and control; solar-PV MPPT control systems and more.

Once again, INTELEC is a practical conference for those involved with powering critical infrastructure telecommunications systems, whether they be wired or wireless. For those interested in attending next year's event, INTELEC 2013 will be held October 13-17 in Hamburg, Germany.

About The Author

Kevin Parmenter has over 20 years of experience in the electronics and semiconductor industry. A former director of Advanced Technical Marketing for Digital Power Products at Exar, Kevin previously led global product applications engineering and new product definition for Freescale Semiconductors AMPD - Analog, Mixed Signal and Power Division based in Tempe, AZ. Prior to this, he worked for Fairchild Semiconductor in the Americas as senior director of field applications engineering. In this role, Kevin led the FAE team in the Americas region plus three regional design centers.

Previously Kevin held various technical and management positions with increasing responsibility at ON Semiconductor and in the Motorola Semiconductor Products Sector. Kevin also led an applications engineering team for the start-up Primarion where he worked on high-speed electro-optical communications and digital power supply semiconductors.

Kevin serves on the board of directors of the PSMA (Power Sources Manufacturers Association) and was the general chair of APEC 2009 (the IEEE Applied Power Electronics Conference.) Kevin has also had design engineering experience in the medical electronics and military electronics fields. He holds a BSEE and BS in Business Administration, is a member of the IEEE, and holds an Amateur Extra class FCC license (call sign KG5Q) as well as an FCC Commercial Radiotelephone License.