

[Editorial]

M2M Communications: Data Capture Without Borders

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With the meteoric rise of China as Earth's manufacturing zone, headlines about air pollution drifting from there to U.S. shores are no real surprise. A front-page USA Today story quotes National Oceanic and Atmospheric Administration research showing that 30% of U.S. ground-level ozone pollution wafts in from offshore.

The article used new data collected by aerial and ground-based sensors to "erase doubts" among skeptical scientists as to the realities of wayfaring pollution. Despite U.S. legislation reducing our ozone output, the ozone content of the world's air has more than doubled since the Industrial Revolution, bringing baseline ozone levels "uncomfortably close" to being unhealthy.

From an electronic design perspective, the gathering of the air-quality data is a salient example of one of the biggest stories in electronics: the building wave of machine-to-machine (M2M) communications and the increasingly high value that networked data collection is bringing to both scientific research and to our everyday lives. After all, ozone is an invisible gas. Without sensors, we'd have no way of knowing just how "uncomfortably close" to unhealthy our air may be!

If networked data collection brings such benefits, how come consumer electronics seem to get all the attention in market-growth forecasts? At a Semico market trends summit I attended this month, Freescale CEO Michel Mayer pointed out that it is human nature to focus on those devices that offer man/machine interface: cell phones, HDTV, iPods, and the rest of the glamorous world of consumer electronics.

Yet the reality is that a true revolution is taking place in the world of M2M communications: machines gathering data and not only communicating in local-area networks but also feeding data to cellular networks and to the Internet, powering revolutionary automation. Mayer predicts the growth in M2M communications will be exponential.

M2M AT ESC

The momentum in M2M was part of the palpable buzz that fueled this month's Embedded Systems Conference in San Francisco. (For a full show overview, go to elecdesign.com and click through to the ESC ShowCast to get all the latest trends from Embedded/Systems/Software Editor William Wong.)

At the show, I visited with Echelon, provider of LonWorks M2M device networking technology. LonWorks is an open-standard network used for building automation, transportation and industrial networks, and more. Echelon debuted a low-cost evaluation kit for LonWorks. Company vice president Michael Tennefoss said the kit should expand the market beyond the more than 40 million LonWorks-enabled processors the company has shipped worldwide. Speaking of air quality, LonWorks technology was recently used to monitor the HVAC and air quality in California schools, exploring the correlation between fresh air and student attention span.

Lantronix was another exhibitor at ESC focused on networking devices. The company's WiPort wireless embedded device server has received FCC certification, eliminating the need for companies

to run specific 802.11b testing. The device server permits access to a local network or the Internet, and it integrates a fully developed TCP/IP network stack and operating system.

Lantronix's exhibit included a "Lantropolis" model railroad village that demonstrated miniaturized versions of networked industrial lighting and machine control applications. "We're networking things that aren't normally networked," said Lantronix vice president Chris Humphrey. For instance, Lantronix's customers include a movie projector company that remotely monitors equipment installed at the theaters it services. Another customer, a pool maintenance company, uses the Internet to monitor chlorine levels at multiple swimming pools via sensor output.

Applications using ZigBee, the IEEE 802.15.4 standard for low-power wireless monitoring and control, were in abundance at ESC as well. Atmel got creative with a remote "cat door" demo, monitoring kitty egress and remotely locking and unlocking the door. Atmel has combined the AVR 8-bit flash microcontroller with Embers' wireless semiconductor systems for an integrated microprocessor, radio, and software solution.

I had lunch with Bob Heile, chairman of the ZigBee Alliance. The recent ZigBee open house, he said, was tremendously successful. The alliance also has announced a new "Adopter" class membership to expand community and spur product development. (See our ZigBee Special Report, ED Online 7186.)

Applications can get a bit exotic outside the man-to-machine frame. Software Technologies Group's ZigBee applications include remote termite detection in ground bait traps, alerting pest control providers when traps have visitors, and ZigBee on the "black box" controllers of rental cars to remotely monitor maintenance needs as well as driving activity (see the figure).

With applications like these, it's easy to see why Forrester Research says M2M messages will surpass the number of messages sent by humans this year!

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