

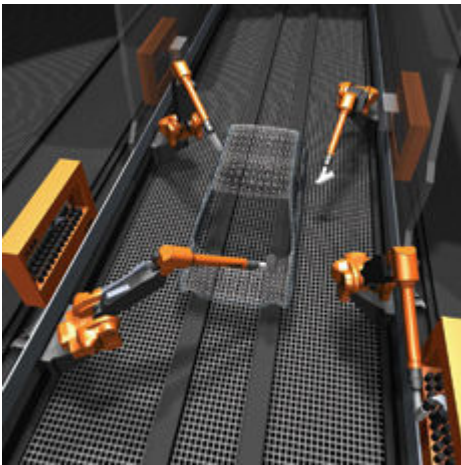
# the MANUFACTURER

## Remote diagnosis

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**With just-in-time production, a company can't afford breakdowns in machinery or other assets.**

*George Schultz explores how machine to machine (M2M) technology can help the maintenance effort*



Suppose a manufacturer could avert unplanned downtimes or, if they should occur, greatly limit the interruption? Interconnecting machines with IT infrastructure and mobilized work forces through machine-to-machine (M2M) technology has proved a multifaceted solution. Factories are tapping its monitoring potential for extending asset life or smoothing the uncertainties of parts replacement. Some OEMs are utilizing it with their equipment customers, either directly or through outsourcing partners in aftermarket services. For them, it can be an added revenue stream.

Not that remote maintenance monitoring and problem diagnostics haven't been mastered before, but the appeal of M2M is its wireless advantage in many shop floor environments, plus often simpler data integration; no cables dangling into grease; no uncertain e-mails for help; no double roundtrips by service engineers.

ABB Robotics Customer Service, for example, developed and piloted a remote monitoring system using a remote client interface and software solution in conjunction with nPhase. The latter is a pioneer in providing comprehensive M2M connectivity with widely dispersed machine or other physical assets to extract and leverage essential operating information.

The ABB program, fully inaugurated this March, serves its manufacturer customers by aggregating, storing and managing operating data from ABB robots equipped with certain controllers. Data goes to a network operations center server owned and operated by nPhase. Connectivity with robot systems is wireless, based on cellular modem technology.

In the event of a robot fault or production loss at a customer's plant, the system creates its own backup containing the robot program, I/O files, system parameters and error logs. Concurrently, upon receipt of the alarm notification and data files from the particular robot, the ABB Technical Support Center, with 24/7 connectivity to controller-enabled robots, begins immediate diagnosis of the problem's root cause, toward correction and restoring production quickly.

A case in point from Steve West, business development manager with ABB Robotics:

"The tech center at 5:20a.m. on a recent Saturday got an e-mail from a robot at a Tier 1 auto supplier. They opened up the message and drilled down to either of two potential root causes of the trouble. Both cases required a part for a computer board in the robot. So we dispatched an engineer with both of those parts to the customer site. They were the right parts, and we got the robot back up and running in about two and a half to three hours.

"We had a very happy customer because they didn't have to go through the process of having a skilled engineer arrive to figure out what the problem was, then go back to get parts and return. It meant a production loss to our customer, so it was significant." The customer, a manufacturer of sun-roofs, "is now requesting that we put more of their robots on the same network at a second plant," West adds.

Even when parts are not the problem, ABB Robotics' remote diagnostics bring value. "When we first began remote monitoring of one plant," says West, "we started seeing an enormous number of red and yellow lights going on (at the technical support center computer) at the start the customer's second shift. The fault that we were seeing proved to have nothing to do with the robot, not a component failure. It had to do with how the operators were starting production at the beginning of that work shift. So we were able to take that data to the plant's operations manager. It allowed us to recommend further training of second shift personnel."

Such successes make M2M for maintenance almost self-promoting, leading to some ambitious industry predictions of dramatically rapid growth within an overall M2M market adoption rate increasing more than fourfold by 2010. Gartner Consulting vice president Nick Jones, analyst of emerging trends and technologies in the wireless and mobile industry, is more tempered in observing "a slow but steady increase of interest in instrumenting machines.

"It's slow still, with the number of units of cellular modems sold worldwide yearly a 'fairly trivial' 50 million modems," he says while acknowledging that other connectivity technologies also are at play, even into "sensors networks for more specialized situations. There is a lot of interest but perhaps not immense amounts of deployments yet."

In the big picture, Jones sees “a very interesting business case for doing this – a lot of machines where there’s a need to know quickly when something is going wrong.” He cites the omnipresent photocopier and instances “where an event [alert] dispatches an engineer even before the company which owns the machine knows it’s gone wrong.”

Traditionally, he points out, there are markets “where maintenance of machines is critical, potentially life threatening if something goes wrong. Companies are required by law to maintain them with specified frequency. Elevator companies were early adopters of telemetry wireless so they can query the state of an elevator and send an engineer when it has cycled a given thousands of times.”

He stresses that “the general principles of business are at work here as well. Take almost any product and add networking and communications to it, which is increasingly easy to do with wireless. And you can turn that into some form of service, a whole new model is opening up – perhaps pay-by-use things, leading to lease or to maintenance as a service rather than the product you buy. So I think a lot of opportunities will open up there.”

On M2M in general, Steve Pazol, president of nPhase, the service provider to ABB Robotics, says, “we look to it as being able to connect to products, machines, devices and assets geographically distributed out there – just like a SCADA system in a plant. That’s pretty much ‘network’ already. This is almost like an Internet for machines. “The big driver in the industrial sector is the aftermarket service,” comments Pazol. “Their profits probably are down; they’re not selling as much ‘steel’. Many are looking at the service part of their business – maintenance, consumables, warranties and the like as really the growth and profit drivers of their business. Aftermarket services “are an avenue to new growth with much higher margin and a recurring revenue stream.” Touching closely to the operational side of the M2M maintenance-support model is a brand new solution from DPSI, the iMaint Integrator. It establishes “bridges” for data flow between its iMaint EAM (enterprise asset management) system and other applications typically running on different systems across the relevant purchasing, financial, and shop floor segments of an enterprise. This differs from support levels required for sophisticated robotics and comparable products but, released just in April, seeks a market in a broad swath of other manufacturing companies and their condition monitoring and analytics needs.

DPSI is a software developer and strategic consultant within the asset management and maintenance field. It saw a need for the new integration tool, explains marketing manager Wayne Blankenbeckler, “because a single unified solution from just one software vendor is rarely capable of meeting the diverse needs of all business units, particularly those affecting the maintenance department. And maintenance cannot be an island to itself.”

Consider maintenance issues, like efficient and precise procurement of replacement parts, in the real world of today’s technology. “If systems at Company A, for example, are not communicating with the EAM system, processes will be paper-based and inefficient,” notes Blankenbeckler. “Inventory levels won’t be up-to-date, untimely condition data and maintenance delays can damage machinery, and double-entry of information will create inaccurate data.

“But integrated and paperless Company B,” he continues, “benefits from automated communications. For instance, PLC (programmable logic controller) readings – from condition monitoring at user-determined regular intervals – can be automatically read into the maintenance EAM system. Out-of-limits readings, such as vibration, temperature, or oil pressure can trigger alerts to managers via pager or cell phone, and work orders can be sent to an engineer’s PDA if the company is using wireless technology. Its system may even generate emergency work requests automatically, with parts and supplier sources matched in the system.

Whichever approach leads to implementing M2M connectivity data, maybe it ties with Gartner’s Jones observation: “I think the issue really is finding business models to use them, as much as anything. One of the things about this market is that it is very, very fragmented. There is lots of interest in very small scale-ups.” But he adds that companies see that “the economics of wireless enabling machines are continuing to improve. Now the price might be \$40 or \$50 for the cheapest cellular modem, but in a few years this might be down to \$30. So it’s starting to look that the incremental cost really will not be very much for putting some communications capability into machines.”