

TECH TRENDS

TECHNICAL NEWS AND TRENDS FROM PREVAS #3 2010



Tomorrow's intelligent technical solutions

Future-proof control system with a focus on production quality and traceability.

Improved quality

Visitors to ArvinMeritor's plant in Lindesberg often show particular interest in the quality assurance system.

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Modern power grids

The production of high voltage circuit breakers that can quickly cut power if anything goes wrong.

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M2M

M2M (machine-to-machine communication) plays an increasingly important role in terms of cost saving, quality improvement, and capacity utilization.

Read more on page 8

The time for genuine integration is finally here!

What's going on in the industrial IT landscape just now? Which hot trends can we see and which technologies will be of future importance? Twenty years ago, the automation industry began talking about integrated systems. Back then, this was in reference to the first steps in integrating conventional instrumentation systems with conventional electrical control components. This was often known as horizontal integration. It was followed by integration with information systems, known as vertical integration, from the shop floor to the boardroom. Communication with business systems became increasingly important. Before the IT bubble burst after the turn of the new millennium, visions of even greater levels of integration could be discerned, in which maintenance systems, business systems, automation systems, planning systems, and mobile solutions would play an increasingly prominent role in industrial IT.

Now, 10 years later, when the technology has taken a number of major steps forward and demands on productivity are continually increasing, integrated solutions are appearing in increasingly more situations. The visions from the turn of the century are starting to be realized. Now it's more a question of making these solutions cost-effective and enabling users to actually benefit from the productivity potential on offer. Examples of important technologies that already play a key role in new developments are mobile solutions (M2M) in maintenance, virtual server farms, and cloud solutions for acquiring data capacity without any direct hardware investments. The gaming industry, with its innovations in user interfaces and breathtaking graphics, has played – and will continue to play – an increasingly important role in future industrial IT, not least in simulation technology and operator training. Last, but not least, information integration will remain very important even in the future. Increasingly fewer people will assume broader roles in production and related work processes, which will demand systems that are easier to use and a strong focus on the operator's work situation. This is a challenge for the suppliers of each component system and intelligent use of new technologies will help us on this journey. Finally, these systems must be adapted to each company's individual needs to drive productivity, safety, and environmental concerns.

At Prevas, this is exactly what we concentrate on to help our customers. This is something we have done for many years, and these efforts will gain even greater importance in the future.

Christer Ramebäck
Business Area Manager Industrial Systems,
Prevas AB



TECH trends

Technical trends, inspiration, and news from Prevas AB.

Prevas is an innovative IT company with a strong corporate culture that provides its customers with world class competitive advantages. Prevas develops intelligence in products and industrial systems. Prevas operates from eleven locations in Sweden (Gothenburg, Helsingborg, Karlstad, Linköping, Lund, Malmö, Stockholm, Uppsala, Gävle, Borlänge, and Västerås), two locations in Denmark (Copenhagen and Århus), and one location in Norway (Oslo), as well as in the United Arab Emirates and India.

For more information about Prevas, please visit
www.prevas.com



Green concerns important in modern IT solutions

Environmental concerns are one of the dominant trends in Prevas' operations. In its 25 years of business, Prevas has provided its customers with knowledge and expertise and is often involved when energy needs to be saved. In everything from crane control at incineration plants and furnace control at rolling mills through emission reports to the design of future electronics.

New office opened in Gävle

Prevas continues to expand and has opened a new office in Gävle, with a focus on consulting services in business and production systems. Initially staffed by about a dozen employees, the goal is to double this figure within a year. The expertise held at the office is the same as that throughout Prevas, but with a focus on embedded systems and industrial IT solutions. Majid Meshkintorreh has been recruited as manager, joining us from his most recent position as IT Manager at Ericsson in Gävle.

Did you know ...

Since its start in 1985, Prevas has delivered customer benefits in the shape of profitable and future-proof IT solutions. One important prerequisite for helping customers in the best possible way is to build long-term relations and to have a deep understanding of each customer's business.



Order from SSAB

Prevas has received an order from SSAB in Borlänge to upgrade the systems used to control and optimize furnaces. The order is valued at SEK 6 million and the delivery estimate is for early summer 2011.

SSAB is a world-leading supplier of high strength steel. Now, when SSAB is seeing increased demand for sheet metal, the

company is making further investments in efforts to streamline and optimize production. The Prevas product FOCS (Furnace Optimization Control System) will replace the existing furnace control system. The new furnace control system is PC-based and features additional functionality, such as two-dimensional temperature calculations.

”With the coming system upgrade, we envision potential for quality improvements and reduced energy costs at the plant, which will also reduce environmental impact,” says Christian Hägglöf, project manager at SSAB.



Picture: www.ssab.se

International venture

Prevas has opened new offices in Dubai, United Arab Emirates and Bangalore, India. These overseas offices are the initial foray into new growth markets and strengthen Prevas’ competitive edge in Scandinavia.

Prevas has found great market potential for its industrial system offering in the Middle East. Prevas’ expertise and competitive solutions are of interest to customers in the region, particularly in the oil & gas, steel & aluminum, and manufacturing industries. Dubai is a good base of operations for accessing neighboring countries in the Middle East.

The office in Bangalore will open with about ten employees, expanding as market needs grow. With Swedish project management and methodologies, a number of local specialists will offer the same Prevas expertise as now with a focus on embedded systems and industrial IT solutions.



HMI solutions for MacGregor

Prevas is developing a future-proof control system based on the Wonderware platform.

MacGregor Hydramarine AS in Kristiansand manufactures deck machinery, cranes, and equipment for offshore vessels and platforms for work both underwater and above the surface. In this niche, MacGregor is among the world elite, which is also one of the reasons the company was awarded the assignment to equip a Japanese research vessel with nine electric winches and cranes.

As part of the project, Prevas is developing a modern control system based on the Wonderware platform. The assignment comprises the delivery of a framework and the development of software solutions that MacGregor can also use for future orders.

Wonderware is one of the world's most popular HMI (Human Machine Interface) programs for controlling and monitoring production-related IT systems. The system's graphic interface will be linked to middleware that handles communication with other platforms and the ship's service system.

Joachim Ivarsson, a software developer at Prevas, explains:

"Wonderware is especially suited to industrial IT solutions. The software includes functions for, among other things, communication, visualization, control, monitoring, and logging. The project includes the integration of the Wonderware System Platform with both Windows Presentation Foundation (WPF) and Windows Communication Foundation, which is Microsoft's programming model for the development of service-based applications and which is a central .NET Framework core technology."

"In a relatively short period of time, we'll build a flexible industrial system solu-

tion spanning the entire field of MES (Manufacturing Enterprise Solutions). The system will be supplemented with eleven digital HD cameras. With these, the operators will be able to check, for example, that the winch spools are not jammed and that the cable runs as it should."

Traditionally, such video monitoring has required separate analog systems. In this project, Prevas is developing a completely digital system with, for instance, integrated digital HD cameras that links all processes and operations.

"Another advantage is that winch control is designed in a similar manner. This is possible because the HMI platform is modular, which has enabled us to reuse both the interface and certain system components, which in turn has speeded



systems development," Joachim explains, and continues:

"Prevas is one of a small number of Nordic IT companies with the necessary experience to build this kind of large and complex system. This is one of the reasons we have been entrusted to take



Integrated systems

In today's shipbuilding industry, it's common for customers to buy complex, more customized vessels. This means that instead of equipping the ship with, for example, a single crane, customers want several cranes capable of performing different tasks and therefore more types of operation. In several cases, ships are hired to the oil industry and used for handling underwater robots, positioning underwater equipment, and similar activities.

Modern HMI solutions are ideal in this context, especially with larger ships fitted with vari-

ous types of equipment. Such a system can include several separate HMI platforms controlled from different parts of the ship and which can also perform several tasks simultaneously.

The project is headed by Børge Christian Mosgren from MacGregor Hydramarine AS (MCG) in Kristiansand, Norway. He explains that much of the project is about developing new functions, with all involved parties contributing suggestions, ideas, and practical solutions for the product design in order to meet the customer's specifications. This is especially important when the project enters a phase with regular factory acceptance tests (FAT). Based on the project prerequisites, which include short lead times, it would be practically impossible for MacGregor Hydramarine to supply on time without the help of external experts from Prevas.

Facts about the project

For Prevas, the assignment entails providing industrial IT consulting services, for a period of little more than a year, with a total order value of approximately NOK 1.5 million. The project started at the beginning of 2010 and will be completed in the first quarter of 2011. Joachim Ivarsson works out of Prevas' Malmö office and the project was sold and coordinated by Geir Jåsund from Prevas' Oslo office. The project shows that Prevas can deliver throughout all of Scandinavia and coordinate resources when necessary.

care of the entire project, from drawing up specifications to the choice of hardware and designing the software from scratch. Our role is to help MacGregor take the step toward this type of modern and future-proof solution," Joachim ends.

ArvinMeritor improves assembly quality with help from Prevas

Markus Andréasson is a project manager at engineering company ArvinMeritor in Lindsberg and one of his areas is quality assurance in the assembly process. Markus explains how, together with Prevas, he better organized assembly quality assurance.

The plant was previously owned by Volvo, and Volvo Buses and Volvo Trucks remain the largest customers. In Lindsberg, the manufacture and assembly of rear axles and the assembly of front axles are in focus. Design work is done elsewhere. Markus works with the assembly processes, and explains that the plant previously used many different forms of quality assurance.

"In the past, many of the solutions were locked in, not at all as flexible as we would have liked. Rigid and somewhat splintered."

"In 2005, we moved front axle assembly from Volvo in Köping to our plant in Lindsberg. At that time, we engaged Prevas' consulting services. Prevas was also involved in a similar project called Linde 97 during the period 1996-97, when the plant was still owned by Volvo."

As early as 2004, it was time to reevaluate things and as such the company reviewed, among other things, its quality assurance systems. There were a few PLC systems, some proprietary systems, and PC-based systems that showed production staff how to assemble the different components.

"We were quite splintered and wanted a new standard for quality assuring our assembly processes. With Prevas' help, we developed a concept based on standard PCs. It links with different I/Os that light lamps, displays guides for production staff, and receives signals from tools such as power wrenches."

The project group drew up different com-

binations of characteristics to be linked to orders. Today, there is a large library of tool and task descriptions that can be combined into assembly instructions. The standard client system enables all combinations to be reused.

The system is very flexible and it's easy to combine the tools and tasks needed to assemble a particular axle. The plant assembles some 2,500 unique variants of front axles and roughly the same number of variants of rear axles each year, so flexibility is a must.

"A standard PC is much cheaper and we've discovered that they're surprisingly durable even in a workshop environment. When they do fail, they're also easy to replace. Before, we had specialist solutions and very few people had the necessary knowledge to recover the systems. Now, in principle, all our electricians can take any spare computer and set it up for any station. The hardware is standard and can be picked up in town," says Markus.

Essentially, the entire system is based on an Oracle database. All orders receive a unique ID and all history is saved in the database. If an axle assembled in Lindsberg should fail out on the road, you can see exactly how that axle was assembled and which torques were used in the power wrenches.

Similarly, it's easy to see which axles may be affected if a member of production staff notices that a power wrench is performing badly. Those axles can then be quickly checked before delivery. This also means

the plant doesn't need to recall an unnecessary number of axles if any problems should arise later.

"The system is based on the no-fault-forward principle. That is, if ten spans must be done, you must tighten ten spans otherwise the production line will not move forward," says Markus.

Today, the plant is 90 percent finished with the switch to the new quality assurance system. He believes the switch will be completed within a year. At the time of writing, SJ – the Swedish state railway – has major problems with faulty train wheels. Could the system you've put together with Prevas have helped SJ?

"It's difficult to say, as I don't know enough about the situation. However, if part of the problem is that SJ doesn't know which wheels were made at a certain time or in a certain place, then this system could have helped SJ identify the affected wheels more quickly," says Markus.

In the future, ArvinMeritor hopes to be able to increase backward traceability. Certain components are received with serial numbers and batch numbers, and these could be used to further improve the quality delivered to end customers.

Markus also explains that when staff from other ArvinMeritor plants overseas come to visit, the quality assurance system often attracts special interest.

ABB breakers protect power grid

In Ludvika, ABB manufactures high voltage circuit breakers for domestic and export sales. Prevas has helped introduce a follow up and traceability system.

If a modern power grid is to function, among other things, transformer stations must be protected against overloads. This requires high voltage circuit breakers that can quickly cut the power if anything goes wrong.

“Most often, a current transformer somewhere in the grid senses whether something isn’t right. It sends a signal to a distribution board, which in turn sends a control signal to circuit breakers at other transformer stations,” explains Mariusz Kapral, production technician at ABB High Voltage Products in Ludvika.

A circuit breaker contains many different components. Prevas’ system is based on bar codes and keeps track of which stations the finished circuit breaker has passed and who has done what at each station during manufacture.

“Once all tasks are completed and the circuit breaker has been checked, it’s assigned a serial number that also provides the key to the information documenting how the circuit breaker was manufactured.”

The plant in Ludvika makes circuit breakers for voltages from 72.5 kV up to 800 kV. Today, the highest voltage used in Sweden is 400 kV. Greatly simplified, transmission lines carrying 72.5 kV are used to supply electricity to smaller towns or city districts. 800 kV transmis-

sion lines are used for longer distances, with countries such as India, Canada, and Russia comprising large markets. The work to introduce the new system began about five years ago. The old system was based on paper control cards that moved between stations during manufacturing.

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“Before, we were forced to turn to the archive to find information. Now we simply print it out. The process of following up which serial numbers may be affected by quality problems discovered

after delivery is also quicker. Traceability increases the quality received by customers and helps us prevent problems,” says Mariusz.

Since the information output from the system can be read in digital format, it’s been connected to a large information board. This board shows how many circuit breakers are scheduled for manufacture during the week and how many have actually been produced. It’s also easy to expand, and new assembly stations can be added by ABB in Ludvika without outside help. New functions, however, are programmed by Prevas.



Mariusz Kapral is a production technician at ABB High Voltage Products in Ludvika. He says that Prevas’ quality assurance system has simplified information management in production and helps prevent problems for customers.



The large information board shows how many circuit breakers are scheduled for manufacture each week and how many have actually been produced.

M2M for greater productivity in industry

European industry is constantly exposed to increased competition, especially from low-cost countries. As a consequence, companies are always seeking new ways to increase productivity in order to overcome the cost advantage of such countries. M2M (machine-to-machine communication) now plays an increasingly important role in terms of cost saving, quality improvement, and capacity utilization. M2M technology can help industrial companies face international competition. At the very least, it provides new opportunities for monitoring and control with the new 4G standard.

Investing in new M2M solutions is an expensive decision for an industrial company, but also offers enormous savings. With wireless control, monitoring, and M2M, productivity is increased, costs are cut in the long term, quality is enhanced, environmental impact is reduced, and customer service is improved, all while complying with government legislation.

to current standards.

One example of functional M2M that saves time and money would be in foodstuff production, where every minute counts and a decisive requirement is that only a certain amount of time pass between harvest and processed, frozen, and packaged product. This demands enormous resources. Or does it?

zation is maximized. With a traceability system connected, you could also continually check the quality of a particular harvest.

Another field with potential in M2M is maintenance. Maintenance costs are known to be very high. Several international studies indicate, for example, that unnecessary maintenance often amounts to a plant's annual profit. M2M is also increasing in importance for factory machinery, as more intelligence can be used for status-based maintenance centrally and more problem-solving maintenance locally. Advanced machines represent costly investments that are intended to provide good returns. Unfortunately, sometimes the costs of downtime or non-optimal utilization are an expensive business that can undermine the investment. With M2M, instead one can, for example, permit the machine manufacturer, via a 4G modem, to monitor and optimize not only a single machine but many machines – on a global scale and from a central location. Obviously, this is altered business logic with a new and more effective division of roles between the machine manufacturer and the production plant. With today's much faster M2M technology, connected to 4G, industry is offered far greater opportunities for automation and communication between geographically distant units. As a result, European industry can better face the challenge from low-cost countries. The secret is to remain one step ahead and to make new technology practical for increasing productivity in production processes.



The time between harvest and processed, frozen, and packaged product can be costly. With M2M, things are easier.

Admittedly, M2M in industrial automation is not a new phenomenon; machines have always communicated with other machines. But with the new 4G network, M2M becomes more functional as 4G can use existing infrastructure while also being based on IP data and not being optimized solely for voice communication. As a result, the 4G network offers opportunities for partially new business logic in M2M. More intelligence, faster connections, and the option to prioritize traffic in the 4G network, as compared

With M2M, things are easier. A reasonable solution is for the harvester, via the 4G network, to communicate 'we are working now' together with the size and estimated delivery time of the harvest. This information is sent to the factory's planning system and secures the necessary production capacity. The truck that later delivers the harvest to the factory sends additional information on the time of arrival and the amount, to enable more detailed planning. In the end, such solutions are much more efficient as capacity utili-

Prevas