

● Innovation

Bake bread with your cell phone

A baking oven with innovative technology and a unique interface. Meet the Hounö company, [page 4](#)

■ Technology

New methods for ultrasound scanning

New method for ultrasound scanning detects arteriosclerosis better and faster, [page 6](#)

▲ Knowhow

New EU directive

Open Scope will apply also to WEEE, [page 8](#)



FIRST LEGO LEUAGE

The world's biggest technology competition for youngsters aged 10 – 16 years, [page 7](#)

NEW TRAINING COURSES IN EMBEDDED SYSTEMS AT KTH, STOCKHOLM, [page 2](#)

We are a leading company of specialists in software, electronics and mechatronics for embedded systems. Our mission is to contribute with solutions generating growth for our customers.

Growth through intelligent product development

EDITORIAL

THE WORD "GROWTH" IS USUALLY ASSOCIATED WITH ECONOMICS.

In this issue of TechTrends, we present a number of exciting case stories, paving the way to economic growth through intelligent product development.

For instance, read about the Danish company Hounö, making ovens for baking in shopping centers and gas stations. They are leaders in the application of smart-phone technology to an industrial application. Hounö's Android interface is capable of controlling the oven on site manually or remotely over the GSM network. Prevas has contributed to this achievement by coordinating the development of the hardware, software and interfacing components and by providing technological competence in Linux and Android.

We at Prevas have lots of experience in authoritative regulations and in the development of medical technology. On page 6, we tell the story of Danish BK Medicals' new ultrasound scanner, helping doctors faster, better and cheaper to diagnose arteriosclerosis. Thanks to technology from Prevas, the scanner has now reached the world market after having passed the tough requirements imposed by the American Food and Drug Administration (FDA).

Last year, we wrote, in TechTrends, about the new Master of Technology program offered by Sweden's Royal University of Technology (KTH) in Stockholm, which Prevas has participated in the development of. But the creation of interest in technological education is a process that must be started long before students approach the tertiary education age. So that industry gets the engineers and technologists it needs. For this reason, driving spirits of Prevas are involved in First Lego League, which is the world's biggest technology competition for youngsters aged 10 - 16. The Mindstorm robots the youngsters program are equipped with a simplified version of LabView, the programming language Prevas is using, e.g. for the testing of JAS Gripen jet engines and Volvo Trucks diesel engines. Perhaps your town has a school or club wanting to participate. "Innovation is about turning dreams into realities", says the book "Inside Innovation – How to make things happen". Innovation is also the mother of growth. Therefore, Prevas' mission is to contribute to growth through intelligent product development. *



JONAS MANN

*Business Area Manager
Product Development, Prevas*

THE ROYAL UNIVERSITY OF TECHNOLOGY, STOCKHOLM (KTH)

Sweden is a leading country in the development of embedded systems and the new courses at KTH at the Master level in embedded systems is one way of maintaining that position. So far, there are no "embedding" engineers but now the university, with strong assistance from ICES – and Prevas – has developed such an education program.

The program has attracted many foreign students. India is traditionally strong in embedded systems and the program has attracted much interest from that country. The applicants had very good marks from their previous qualifying educations, which resulted in no less than five scholarships out of 57 at KTH being awarded to Embedded Systems students.

S.E.E APRIL 17-19

Come and see us at the Scandinavian Electronics Event (SEE) at the Kista Fair outside Stockholm. We will be there alongside our partner, Kitron, in Stand C05:40.

Two of our experts will deliver lectures as parts of the program.

xMove

Prevas' test platform, xMove is now available as Generation 2. It helps developers test the functions of up to 30 controllers, corresponding to all the electronics of a complete vehicle. This platform makes it possible to deliver customer-adapted solutions cost-effectively by combining standard components.

Prevas has built up solutions that have helped customers test everything from comparatively simple pump controllers to advanced control systems, such as that running the JAS Gripen jet engine. Other applications include controllers for chemical processes, driverless trucks and advanced manufacturing machines. All this indicates that the field of applications for xMove is a wide one.

Innovation for Growth

With leading expertise in embedded systems and industrial IT, Prevas contributes by providing innovative solutions that create growth. Prevas is hired by customers wanting to develop smart products with IT contents and by customers wanting to streamline and automate their operations. The company has offices in Sweden, Denmark, Norway, Germany, United Arab Emirates and India.

www.prevas.se

Prevas

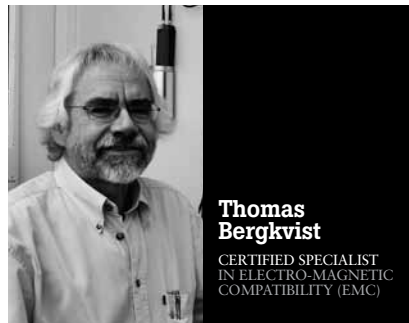
PREVAS HAS OPENED UP ANOTHER CAREER PATH: TECHNOLOGICAL SPECIALIST. SPECIALISTS AT PREVAS SHALL HAVE LEADING-EDGE COMPETENCE IN TECHNOLOGICAL AREAS OF IMPORTANCE TO THE COMPANY.

NEW CAREER PATH TECHNOLOGICAL SPECIALIST

MANY TECHNOLOGICALLY INTERESTED PEOPLE prefer spending their time on keeping abreast of their fields rather than on managerial issues. Consequently, Prevas has opened the door to an alternative career path: Technological Specialist.

Specialists at Prevas shall have leading-edge competence in technological areas in which the company operates. They are responsible for ensuring that the latest advances in their fields become available to the company on a broad front, to the benefit of both the company and its customers. This calls for active participation in the implementation of new technologies, lecturing, network-building, both internally and externally, and ensuring that the required competence is available in the company.

One of the company's recently certified specialists is Thomas Bergkvist, who graduated from KTH, Stockholm, in 1972 in electrical engineering. Thereafter he became partner in a company, which operated in the



field of electronics design. Thomas participated in the development of Electrolux' well known, round, robotic vacuum cleaner and he is still in the forefront of technological development. He is one of Sweden's foremost experts in Electro-magnetic Compatibility (EMC), a field being one of the toughest challenges for engineers involved in embedded systems and one being of pivotal importance in all product development where electricity plays a part. The EU's EMC Directive, imposing requirements on products to emit a minimum of electro-magnetic

radiation and to withstand such radiation from outside, must be adhered to.

These requirements are detailed in a large number of international and national standards.

Unfortunately, many developers realize this far too late, leading to unnecessarily expensive remediation processes for customers.

– I really would appreciate developers' coming to us earlier, before they even decide on the encapsulation of their products, says Bergkvist. "We give advice before actual design commences, review designs later and are able to test prototypes in our EMC lab before customers spend far more money on tests in other labs."

– Many problems are easy to solve at the beginning but difficult and expensive to put right at the end, he says. For Thomas, the role of EMC specialist is both a private passion and a professional occupation and much of his spare time is devoted to his subject. Among other duties, Thomas is a member of the IEEE's EMC Society. He is also an expert in Signal Integrity (SI), an area not too far removed from EMC and one being applicable to all electronics where pulse frequencies are high, e.g. embedded systems with fast processors, communicating with fast memory circuits. *

CONSULTING / REVIEWING / COMPLIANCE TESTING / CERTIFICATION SUPPORT

NEW POWERFUL BUSINESS UNIT IN NORWAY

By acquisition, the Development House CREO in Norway has been transformed into Prevas Development. This new Norwegian Business Unit accepts assignments in electronics, embedded software, mechanics and industrial design, in the form of both project deliveries and purer consulting services.

The acquisition of this specialized and experienced development company was inspired by the growing interest in hiring Prevas as a development partner to streamline development, also among Norwegian customers. Prevas Development currently employs 70 people where all, except one, are engineers. The unit belongs to Business Area Product Development. Prevas Development AS is already strong in medical technology, having

customers such as GE Vingmed Ultrasound AS in its portfolio, and in military defense with the Kongsberg Group as a prominent customer. After incorporation into the Prevas Group, this new Norwegian operation is able to take on more and bigger jobs, something that pleases the President, Lars Morten Andreassen, a lot.

– We are pleased to have become part of Prevas and the fact that we now have a big company behind us, says Andreassen. "This underscores our commitment to product development and gives us a stronger financial backing and access to all of Prevas human resources, to the benefit of our clients." "If a customer needs a specialist we are, from now on, able e.g., to say: 'Certainly, we have such a person in Denmark'".

"This way we have become a bigger player in product development and see only advantages in marketing our services under the Prevas name."*

TOMORROW'S OVENS ARE CONTROLLED BY CELL-PHONE TECHNOLOGY

When the Danish oven-maker, Hounö, was planning their future control solutions for their baking ovens, they were looking for a system that was easy to understand and use. The choice fell on Android.

Morten A Nielsen is President of Hounö, a maker of baking ovens for hotels, restaurants shopping centers, gas stations and similar establishments.

– We make high-end combinational baking ovens and the goal of our project was to develop the most user-friendly oven on the market, says Nielsen. “Primarily, we tried to identify the right technology and the right platform. In that area we had become impressed by the cell-phone industry and concluded that it has much to offer us too.”

– In addition, we wanted an innovative platform and Android is the fastest growing now. So we chose Android for our new Visual Cooking Touch ovens. We are not the first with a cell-phone interface in an industrial application but we are early, says Nielsen.

He says that the goal was to get an oven offering much innovative technology and a unique interface, which the users would be able to recognize from their mobile phones.

The developers were musing over how to get an application that can be used in different customer segments such as restaurants, shopping centers and gas stations. Currently, the ovens are not intended for domestic use.

The interface consists of faceplate on the oven and of a cell-phone application, both for Android, Google’s

open-source operating system for cell phones based on Linux.

– We have had good cooperation going with Prevas even when we developed our earlier control systems, says Nielsen. “They were also based on Linux.”

The Android interface of the oven facilitates control, up front, via a built in control panel, or over the GSM cell phone network. The operator, wanting to sleep a little longer in the mor-

// Prevas contributed in important ways to our project, both in terms of hardware software and application development. They have lots of know-how in Linux and Android.



Hounö's new Visual Cooking Touch ovens are controlled by a built-in Android application.

ning, is able to start up the oven from home, using his mobile phone, rather than getting up earlier, going to work and starting it up there.

– From our website, it will be possible to fetch recipes directly to the oven, provided it has access to our site wirelessly or by GSM. Another way is to download to a cell phone and then transfer the download to the oven by Bluetooth.

According to Nielsen, there is no risk of hackers' getting access to the oven from the wrong cell phones. Protection against that kind of thing is built in.

– We argue that the user-friendliness of our new ovens is a great advantage, Nielsen says. "Few people read the usage instructions for their mobile phones. Our fine icons and good interface reduce – or eliminates – the need for training. Our interface is self-explanatory."

Hounö supplies ovens and applications as a package and will develop applications for the bigger customers on a request basis. Customers will however not be able to develop apps by themselves.

Start of marketing is planned for the summer of 2012 and the prices will be in the DKR 50,000 – 250,000 range.

According to Nielsen, the ovens were well received at the Host industrial fair in Milano recently.

– Prevas contributed in important ways to our project, both in terms of hardware software and application development, says Nielsen. "They have lots of know-how in Linux and Android."

"They also helped us coordinate the hardware, software and interface parts. But all this was according to expectations; we knew them from before." *

IN 2011, XILINX, A LEADING SUPPLIER OF PROGRAMMABLE LOGIC ARRAYS APPOINTED PREVAS EXCLUSIVE TRAINING PARTNER FOR THE NORDIC COUNTRIES. PREVAS WILL PUT MUCH EFFORT INTO SUCH TRAINING IN 2012 AND OFFERS A LARGE PALETTE OF SCHEDULED COURSES DURING THAT YEAR.

PREVAS PROVIDES TRAINING IN PROGRAMMABLE LOGIC

KNOWHOW

The ever faster technological development and the stiffer

international competition pose requirements on companies. There is also a clearly visible lack of competence in certain key areas, aggravated by a fast rate of retirements and a slow rate of technological education, at least in Scandinavia. These requirements are accentuated by the fact that ever more products contain elements of electronics and computer technology.



Prevas' training courses include both theory and practical sessions and they span the range from basic coverage to in-depth study.

The duration of the courses varies from one to three days and they are based on high-quality material developed by Xilinx and adapted by Prevas.

The year 2012 will be a very exciting one. In that year, Xilinx will release both its new generation of development platforms, Rodin, and the new Zynq platform. These two new arrivals will make the courses even more valuable for bringing developers up to date and able to make productive use of the new possibilities these new platforms offer.

The training course offering can be viewed at www.prevas.se/kursschema. *

XILINX FPGAS ENABLE NEW WAYS OF ULTRASOUND SCANNING

RECENTLY, A NEW ULTRASOUND SCANNER WAS INTRODUCED TO THE WORLD MARKET. THANKS TO TECHNOLOGY FROM PREVAS, DOCTORS WILL, FROM NOW ON, BE ABLE TO DIAGNOSE ARTERIOSCLEROSIS BOTH BETTER AND FASTER.

TECHNOLOGY For the first time, medical instruments from Denmark's BK Medical are able to measure the direction of blood flow in blood vessels and the rate of flow. The method is called Vector Velocity Imaging and it does not require any substance to be injected into the blood stream for it to work. This enables doctors to measure the amount of coating there may be in the blood vessels.

– This amounts to a good and inexpensive way of diagnosing, says Professor Jørgen Arendt Jensen at the Technological University of Lyngby, situated some 10 km north of Copenhagen.

He and his colleagues have provided much of the research underpinning the new instrument. The first trials with the new method were made with the research scanner Rasmus, which was developed by Prevas. These trials showed that the method works in clinical applications, which is why it has been adopted as basis for BK Medical's new scanner ProFocus.

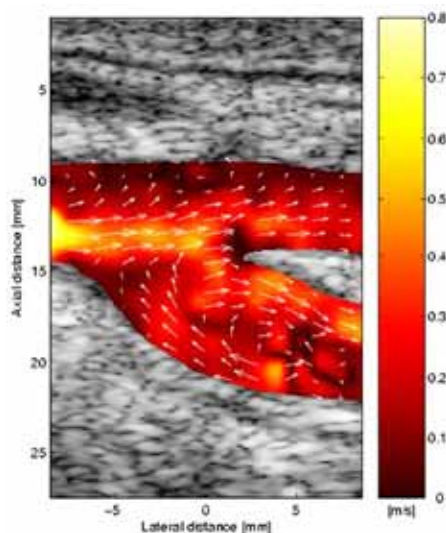


He mentions that the instrument, Vector Flow, from BK Medical, also passed the tough requirements imposed by the American Food and Drug Administration (FDA).

His latest project is the ultrasound scanner Sarus, which, after a development time of seven years, is nearing completion.

Like the Rasmus scanner, the control circuitry of the Sarus is heavily based on programmable logic arrays,

// Sarus is an interesting scanner. It is able to generate 140 GB of data per second, corresponding to 70,000 simultaneous HDTV channels.



VECTOR VELOCITY IMAGING shows both the direction and rate of blood flow in blood vessels. Arrows indicate direction, colors rate.

so-called FPGAs.

The Sarus is equipped with 320 FPGAs, together providing computing power which is equivalent to some 5,000 ordinary PCs.

– Sarus is an interesting scanner. It is able to generate 140 GB of data per second, corresponding to 70,000 simultaneous HDTV channels, says Prof. Jensen, unable to hide his pride.

All this computational power requires two racks of electronics, both as big as refrigerators, where 15 kW of electricity is converted to measurements.

It might sound strange that an FPGA is able to offer more computational power than a PC.

– These FPGAs are not small but the largest we were able to get hold of in 2005 when the project started. This is a very big project. The hardware development is now done and we are now working with the system, trying different methods, to improve the images the system produces.

His cooperation with Prevas dates back to 1998 when Rasmus was developed, also containing plenty of FPGAs. At that time, the company was called IO Technologies.

– When we chose Xilinx from Prevas, seven years ago, it was important to us that the circuits were flexible, that performance was good and that there was plenty of software available from which we were able to pick and choose. *

FIRST LEGO LEAGUE/LEGO MINDSTORM IS THE WORLD'S BIGGEST TECHNOLOGY COMPETITION FOR YOUNGSTERS AGED 10 – 16 YEARS. PREVAS SPONSORS THE ARRANGEMENT AND PROVIDES A JUDGE PANELIST: HANS NYSTRÖM.

First Lego League **LEGO MINDSTORM**

KNOWLEDGE

The purpose of the competition, based on the use of Lego blocks, is to arouse

interest in technological education early. While Swedish industry requires enough of a base to recruit engineers from, it is a problem to make young people interested in technology. The participants of First Lego League are able to participate, team-wise, on a per-school, per-association or per-club basis.

– We want to create interest and make technology more accessible. In the past, it was easy to find gadgets one could dismantle: clocks, radios and TV sets, field telephones, etc. But today, everything is so much more monolithic and refined. Just think of all the technology and intelligence that is built into today's computers and mobile phones. These days, technology is more encapsulated, inaccessible and invisible to the eye. Youngsters still need to jog both their bodies and their minds. In Gothenburg, there are approximately 100 football clubs but only one technology club, says Hans Nyström, PD (??) manager of Prevas in Gothenburg. In First Lego League, the youngsters get very close to the work carried out in real companies. In the technology category (one of three) the participants

use a simplified version of the graphical programming language LabView, which is developed by National Instruments and used by Prevas for more than 15 years as one of our programming languages. For instance, Prevas has used LabView to develop advanced test systems for the jet engine of JAS Gripen and for Volvo's truck engines. Swedish schools, having participated in the competition, can be found in Borlänge, Härnösand, Eskilstuna, Karlstad, Skövde, Kista, Gothenburg, and Västerås.

The several categories of the competition make the project work not only covering the natural sciences but also the more humanities-related subjects of Swedish and English.

The work form is also adapted to product development in industry.

First Lego League is also run in Norway and Denmark where the competition is an even bigger affair than in Sweden, relatively speaking.

– We really should have more schools involved, or else Sweden will lose competitive edge. We must also remember that technology not only consists of technological challenges but every bit as much of social interaction where one learns to cooperate and contribute to one another's ideas, says Nyström. *

FACTS: LEGO MINDSTORM THEME: SENIOR SOLUTIONS

How it works: The schools/teams/clubs compete in three different categories. This year's assignment consists of creating technical solutions improving quality of life for the elderly. Read more @ <http://se.hjernekraft.org>

If you, Dear Reader, are a parent of a child aged 7 – 9, please prompt your child's school to participate!



THE WEEE DIRECTIVE IS BEING REVISED

On January 19, 2012, a three years long haggle in the EU bureaucracy over what to do with the WEEE directive suddenly ended. On that day, the EU Parliament voted for a compromise that only has another couple of formal steps to go before it gets ratified and so becomes a basis for national legislation.



When the EU Commission put forward its suggested amendments to the RoHS and WEEE directives three years ago, the purpose was primarily to reduce bureaucracy and improve member-national harmonization.

But things did not quite turn out that way.

Strong political forces got involved to expand the scope of the directives and the term "Open Scope" was launched. During the debates, it was also noted that the link between the two directives no longer was tenable.

The revised RoHS directive was adopted in July 2011, in which Open Scope was introduced as an eleventh supplement, meaning that all electrical and electronic products not covered by the preceding ten product categories are caught up in this new eleventh category. When RoHS2 was done, the debate about the WEEE directive regained momentum. In view of the sluggish pace that issue had progressed previously, the finish went remarkably quickly. The compromise churned out is not exactly easy to interpret in all its details but, in the main, we now know what is in store for us.



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equipment which can only be used in exempted equipment, and filament lamps. As of expiry of that grace period, Open Scope will take over, divided into six product categories (see adjacent tables).

SCOPE Also for WEEE, Open Scope will apply, i.e. to all electrical and electronic products, unless explicitly exempted.

There will be a six-year transitional period from the time it enters into force. During that interim period, the current ten product groups will remain, with the exception of military equipment,

NATIONAL REGISTERS The WEEE directive will continue to be a mini one, meaning that the requirements in it will represent the minimum standards imposed but that member countries are free to impose stricter standards in their national legislation. Even product registration will have to be done by the member countries individually. The requirement of industry for central registration has not been met, although the directive text so far encourages member countries to improve harmonization and cooperation.

DESIGN REQUIREMENTS Member countries are called on to improve cooperation between producers and recycling companies and to take measures to encourage producers of electric and electronic equipment to design and manufacture it to facilitate re-use, dismantling and recycling. The text specifically refers to the Eco-design directive (2009/125/EG) which, this way, is becoming linked to WEEE. *

WEEE2 SCOPE (SIX YEARS AFTER IMPLEMENTATION)

The term Open Scope is defined as covering the following six categories:

1. Equipment for temperature control.
2. Screens, monitors and products with display screens larger than 100 cm².
3. Lamps
4. Expansive equipment (with outer dimensions exceeding 50 cm), including household appliances, IT and telecommunications equipment, consumer equipment, light fittings, sound and image reproduction equipment, musical equipment, electrical and electronic tools, toys, leisure and sports equipment, medical equipment, supervision and control instruments, vending machines, products for the generation of electric currents. This category does not include products covered by categories 1-3 above.
5. Small equipment (no dimension exceeding 50 cm), including household appliances, consumer equipment, light fittings, sound and image reproduction equipment, musical equipment, electrical and electronic tools, toys, leisure and sports equipment, medical equipment, supervision and control instruments, vending machines, products for the generation of electric currents. This category does not include products covered by categories 1-3 above.
6. Small IT and telecommunications equipment (no dimension exceeding 50 cm).

WEEE2 EXEMPTIONS (IN ADDITION TO EXISTING EXEMPTIONS)

The following equipment kinds are not considered being covered by Open Scope:

- a) Equipment intended for launching into space.
- b) Large-scale, stationary, industrial tools.
3. Large-scale fixed installations except equipment not being specifically designed for, and installed, as parts of such installations.
- c) Means of transport for people or goods, except electrical, two-wheeled, vehicles lacking type approvals.
- d) Mobile machines not intended for road transport, which are exclusively made available for professional use.
- e) Equipment exclusively designed for research and development purposes and made available exclusively to companies by other companies.
- f) Medical equipment for in-vitro diagnostics when such products are expected to be contagious before their end of useful life, and medical equipment for implantation.