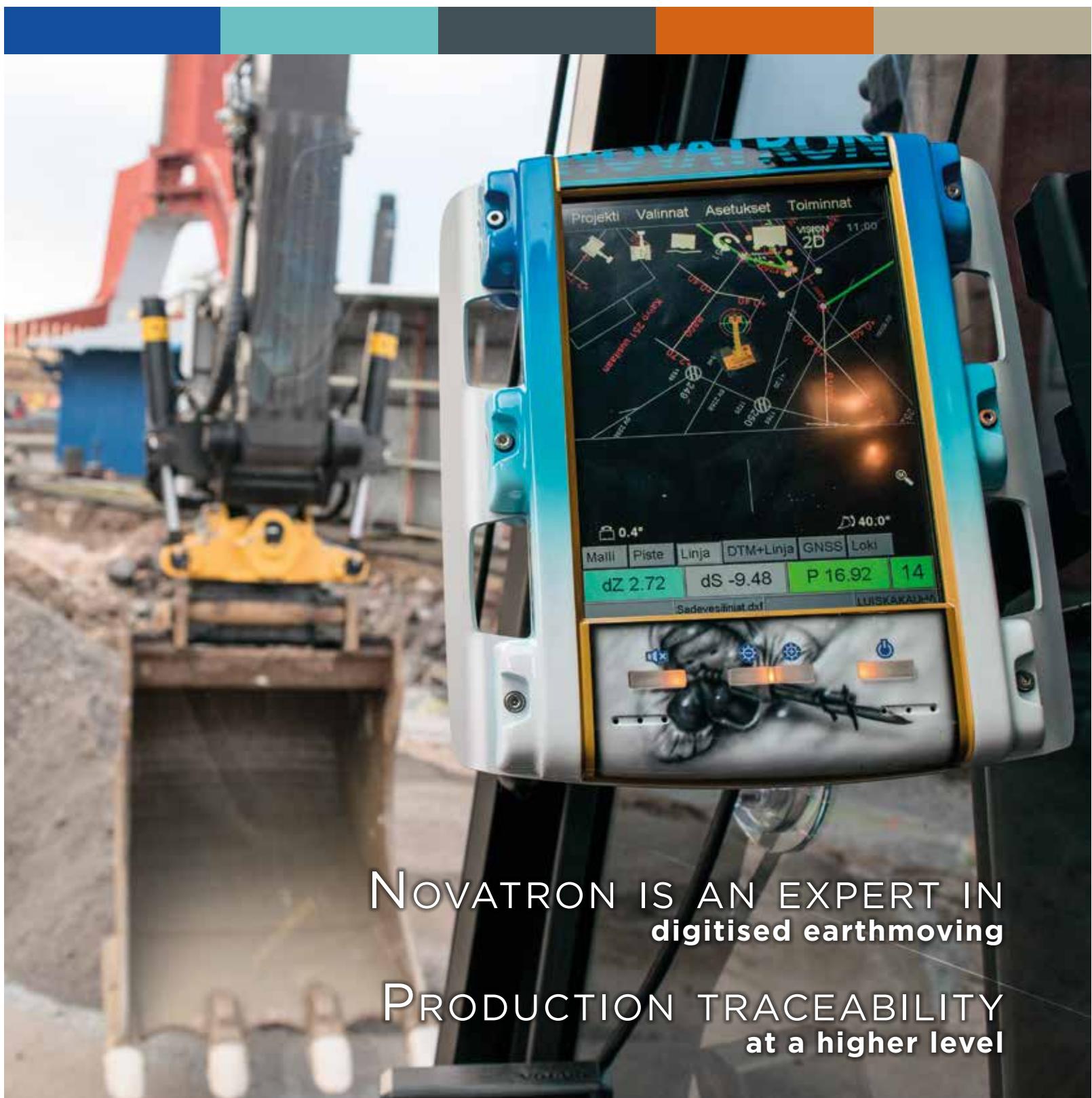




# DAREKON.net



Novatron is an expert in  
digitised earthmoving

PRODUCTION TRACEABILITY  
at a higher level



# DAREKON.net

AUTUMN • 2018

CUSTOMER MAGAZINE OF DAREKON LTD



**6** Machine control systems developed by Novatron Oy indicate the position and depth of an excavator bucket with the precision of a few centimetres. Note the two key antenna poles at the back of the machine.

**10** Advancing with consideration. Managing growth can be done without the need for mega acquisitions if it is handled with scrupulous care. The Orpo brothers are decent people.

**14** A laser engraving system makes it possible to identify each printed circuit board individually and authenticate production series and other information of components mounted on it.

**“** Recycling is a natural part of all manufacturing.”

**16** Darekon's Klaukkala facility is a sheet metal workshop and a plant making final assembly of electronic equipment. But it is also a versatile planning office, robotised welding shop, logistics hub and much more.

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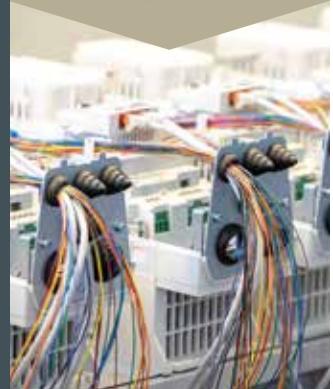
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### Evolution, not revolution?

We live in interesting times. The available information in the world increases exponentially. Those who can analyse it correctly will be the winners. Darekon aims to belong in that group.

Our revenue last year increased to 43.1 million euros and profitability was on the budgeted level. We have expanded our customer base during recent years and our biggest customer now accounts for 15 per cent of total sales. Changes made to the firm's structure in the last accounting year have been completed. All Darekon's operations in Finland are now part of Oy Darekon Ltd while operations in Poland are in the daughter company, Darekon Sp. z o.o.

The economic situation in Finland has improved during the last couple of years and the outlook has two central factors. On the one hand our clients' sales are going well and our own sales have reached yet another record. On the other hand the unpredictability of the development of world trade and the remarkably extended delivery times of certain electronics components suggest grey clouds on the skyline. We have prepared for the situation by increasing our inventories and by developing, together with our clients, better systems for estimating demand.

During this year we have invested in better traceability of components and in a better AOI system at our Haapavesi facility. In Klaukkala we are investing in welding and sealing robots. They will help us offer more versatile assembly and welding services. Alongside that we have recruited more than 20 people this year so we can better respond to clients' increased needs.

In the customer introduction part of our magazine you will find the frontrunner in intelligent machine control, Novatron Oy, with whom we have cooperated for seven years. The firm has expanded and developed in all of that time. It is great to see our clients succeed.

The outlook for the year ahead is positive and we continue developing our operations together with our clients and suppliers. We also continue to actively examine possibilities to develop and expand our operations according to our strategy.

Kai Orpo



We prepare  
for the future."



## The tireless eye of the 3D AOI system

Darekon has invested in an Automatic Optical Inspection (AOI) system based on three dimensional machine vision at its Haapavesi facility.

The old Orbotech inspection system that served for 10 years at Haapavesi was replaced with a new Kohyoung Zenith AOI system that will connect online to the assembly line.

### Inspection with micrometres accuracy

The acquired equipment is the world's most popular and first completely three dimensional automatic optical inspection device. The machine aims eight light beams on the examined board and reads

the resulting reflection with a precision camera.

The camera identifies the moiré pattern created by the light beams and can with this technology measure height differences of less than 10 micrometres ( $\mu\text{m}$ ) on the board. This accuracy is high enough to create reliable information on soldering quality.

"Running in" the machine is currently underway at Haapavesi where staff are collecting a database and optimising the functions of the machine. After the work is complete the machine will be connected online to the assembly line. A 30 board buffer between soldering and the AOI device is part of the entirety. The target is to automatically inspect all our SMD boards with this machine vision.

### More throughput and productivity

"When the boards come out automatically inspected from the line, the need for manual inspection is reduced," says Jari Aspegren, quality manager at Darekon. "The machine is fast and the people that previously took care of manual inspection are largely released for other tasks, so our productivity improves and we get more done."

"It is also absolutely essential that the machine does not get tired; it reliably inspects in the same way all the time. The AOI device is an important part of controlling and automating the production process. If there are any deviations in the process, we get feedback as soon as possible and are able to ensure flawless production."



## No sweat at Haapavesi this summer

**FOR SURE** Haapavesi enjoyed a hot summer as did the rest of Finland but the new air conditioning at Darekon's manufacturing facility and the energy wells drilled in the rock under the facility fulfilled their tasks excellently. Inside the building it was fresh and cool, great working conditions.

During the expansion of the facility fifteen energy wells were drilled under the new part – each 300-meters deep. The most important role of the wells is cooling, because solder lines, washers and many other machines produce a lot of heat. The facility is connected to the district

heating system so the role of heating is secondary.

In the middle of August the temperature of water coming from wells in the cooling system was about +10°C, so the temperature of the rock seems to have risen considerably from the typical +4°C temperature. Ten-degree water can, however, easily take care of any required cooling.

In winter the heat stored in the rock will be used for pre-heating incoming ventilation and will reduce the need for district heat. In spring the temperature of the rock will have lowered to a couple of degrees plus.

## Darekon invests and recruits in Poland

There are great opportunities at Darekon's Polish manufacturing facility as significant new production begins. Darekon has prepared for the situation with notable investment and recruitment.

Darekon has invested in a new stencil-printing machine at its facility in Poland. The EKRA SERIO 4000 COMPACT machine is replacing existing equipment at the site.

Stencil printing is a critical part of SMD manufacturing. It is essential that printing is done fluently. The new machine is faster and more accurate and has a built-in inspection system.

The machine has an advanced, easy to use and intuitive user interface for programming it fluently. Job changeovers are very fast. The machine also has an automated PCB support system, removing some human factors.

A new reflow oven is also replacing an existing one. The new Vitronics Soltec Centurion Model 1040 machine with 11 top/bottom heating zones and 3 cooling zones is equipped with a central board support system. Heat transfer is the best in its class so the heat differences in the products are as small as possible and the oven consumes less energy.



While production increases, the need for examining the ready-made PCBA boards also increases. Automatic Optical Inspection (AOI) is the natural way forward, as the machine's eye does not tire.

New stock is coming into production in Poland, which means more need for capacity and AOI will be one way to increase that. A Yamaha YSi-V 12M 3D High-End Hybrid Optical PCB inspection machine has been purchased.

The recruitment of ten employees includes production operators and a junior purchaser and production planner. Basic knowledge of electronics production is important but any special training will be done in-house after the staff have been employed.

## Ten people will be hired at Haapavesi

**IN HAAPAVESI** demand is increasing and there is more to do. To ensure efficient production new operators will be employed at the facility. The increased production rests on a solid base as orders from all clients are growing steadily.

"The growth of production is focused on automatic lines, where we need more throughput," says **Antti Järviuoma**, plant director at Darekon's Haapavesi facility. "This is naturally reflected in manual work. It is difficult to find experienced employees in this field so we will largely train our new employees in-house.

"We look for new people with open minds. Education is not the most important selection criteria, but the right attitude. For competent and motivated people we can offer permanent employment and long-time tasks."

"We haven't had such a fast growth sprint for a long time," continues Järviuoma. "The best thing about the growth is that it is on a very solid basis. No single client has created the peak in demand, instead there is growth across the board for most of our clients. Export is going well and there is demand for our clients' products around the world."

## Stick gymnastics is done in Klaukkala every week



Exercise is one important way to improve staff well being. Darekon always takes care of its personnel.

AT DAREKON'S Klaukkala facility the staff have exercised for years. During the last year a person from occupational healthcare visited the facility

every week to do stick gymnastics with the personnel.

"Stick gymnastics has become very popular here," says **Pekka Antikainen**, plant director at the Klaukkala facility. "We do the gymnastics on the factory floor, between the punching machines and press brakes. There is easily space for ten people at a time and in two groups we have some 20-25 participants – easily one third of the personnel. It is not only women

that understand the importance of exercise nowadays – the tough metal workers are also actively involved."

A masseur also visits the plant every two weeks. Staff have to pay for the service themselves but the space and table are always there for use.

## The final stages of updating medical standards

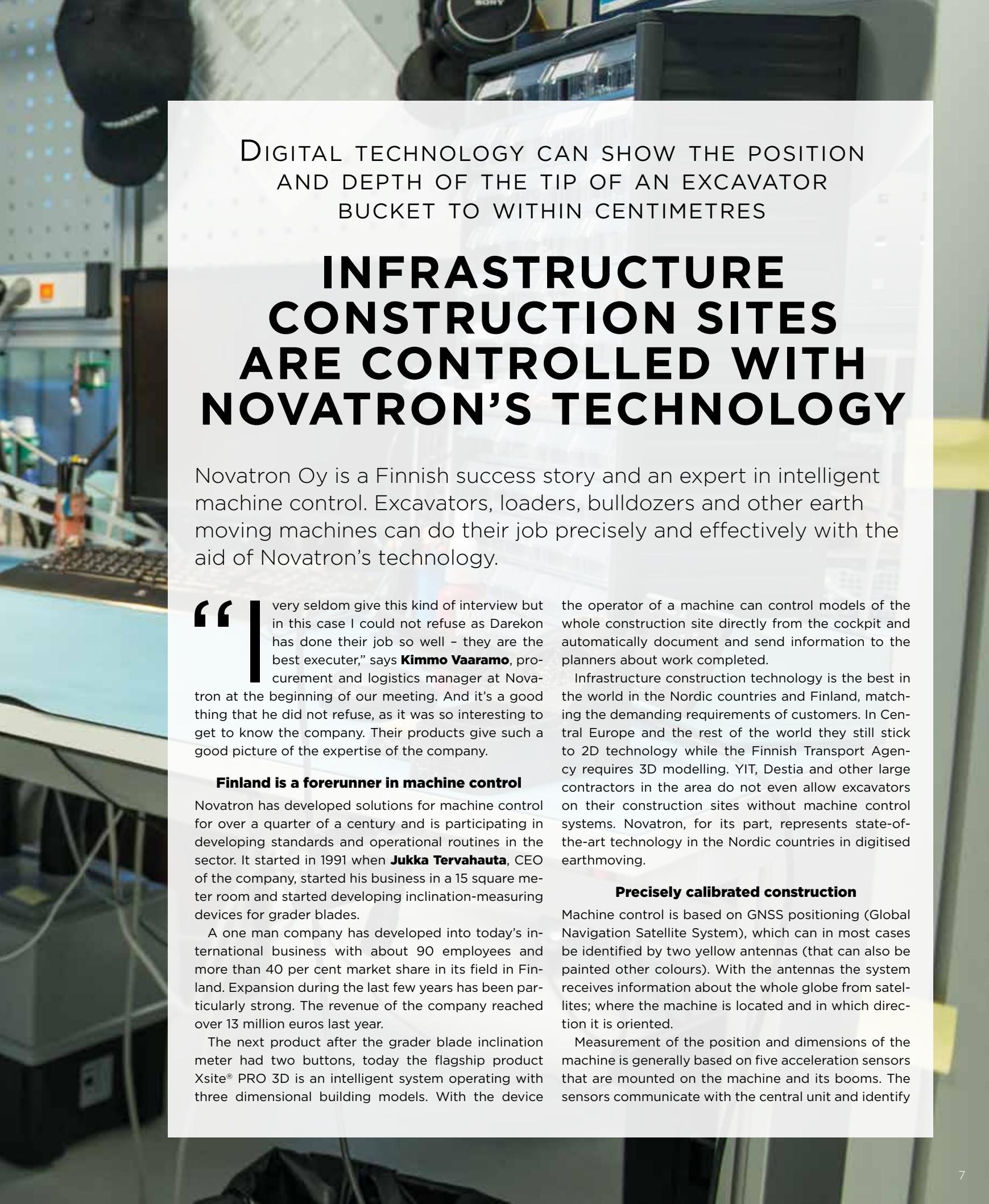
**DAREKON** follows several international standards that guides production in its operations. ISO is an international organisation with membership formed of national representatives of ISO standards in 161 countries.

The standards are updated every few years. Darekon updated the quality management standard ISO 9001:2015 and environmental management standard ISO 14001:2015 two years ago. The medical devices standard ISO 13485:2016 is the latest version of this standard and it will be implemented by the end of this year.

"We have been obeying the medical devices standard ISO 13485:2012," says **Jari Aspegren**, quality manager at Darekon. "We have now made the amendments required by the new version and documentation is in the process. Auditing will take place near the end of the year and the new version will be taken into use before the change of the year."



Kimmo Vaaramo shows one of Novatron's typical products. Darekon manufactures the electronics.



DIGITAL TECHNOLOGY CAN SHOW THE POSITION  
AND DEPTH OF THE TIP OF AN EXCAVATOR  
BUCKET TO WITHIN CENTIMETRES

## INFRASTRUCTURE CONSTRUCTION SITES ARE CONTROLLED WITH NOVATRON'S TECHNOLOGY

Novatron Oy is a Finnish success story and an expert in intelligent machine control. Excavators, loaders, bulldozers and other earth moving machines can do their job precisely and effectively with the aid of Novatron's technology.

**“** I very seldom give this kind of interview but in this case I could not refuse as Darekon has done their job so well – they are the best executer,” says **Kimmo Vaaramo**, procurement and logistics manager at Novatron at the beginning of our meeting. And it’s a good thing that he did not refuse, as it was so interesting to get to know the company. Their products give such a good picture of the expertise of the company.

### Finland is a forerunner in machine control

Novatron has developed solutions for machine control for over a quarter of a century and is participating in developing standards and operational routines in the sector. It started in 1991 when **Jukka Tervahauta**, CEO of the company, started his business in a 15 square meter room and started developing inclination-measuring devices for grader blades.

A one man company has developed into today's international business with about 90 employees and more than 40 per cent market share in its field in Finland. Expansion during the last few years has been particularly strong. The revenue of the company reached over 13 million euros last year.

The next product after the grader blade inclination meter had two buttons, today the flagship product Xsite® PRO 3D is an intelligent system operating with three dimensional building models. With the device

the operator of a machine can control models of the whole construction site directly from the cockpit and automatically document and send information to the planners about work completed.

Infrastructure construction technology is the best in the world in the Nordic countries and Finland, matching the demanding requirements of customers. In Central Europe and the rest of the world they still stick to 2D technology while the Finnish Transport Agency requires 3D modelling. YIT, Destia and other large contractors in the area do not even allow excavators on their construction sites without machine control systems. Novatron, for its part, represents state-of-the-art technology in the Nordic countries in digitised earthmoving.

### Precisely calibrated construction

Machine control is based on GNSS positioning (Global Navigation Satellite System), which can in most cases be identified by two yellow antennas (that can also be painted other colours). With the antennas the system receives information about the whole globe from satellites; where the machine is located and in which direction it is oriented.

Measurement of the position and dimensions of the machine is generally based on five acceleration sensors that are mounted on the machine and its booms. The sensors communicate with the central unit and identify



**Elina Puurunen**, marketing communications coordinator at Novatron, shows how the Xsite EASY measuring system works at the company's training facilities. The model of the booms show the positioning of acceleration sensors and an LED matrix shows if the bucket should be raised or lowered.



The excavator simulator would be the toy of choice for every little boy. In more serious use it is perfect for hands-on learning about the functions and operations of the 3D control system.



The 22-ton Volvo excavator of LM-Suomiset Oy from Eurajoki – and the Xsite PRO operating panel on the first page of this magazine – are elegantly painted with motifs celebrating Finland's 100 years of independence.

“

Darekon  
is the best  
executor.”

their position continuously. During installation the whole system is calibrated, and the dimensions of booms and other factors are defined. The result is a system that knows the position of the tip of the bucket on the globe with a precision of 1 to 2 centimetres.

The system is controlled with an easy to use touch screen panel that the operator interacts with. The GNSS compass always shows the direction of the machine and allows the possibility of making two-angled slopes precisely. Bucket corner indicators show the height difference to the selected surface from the left and right corner of the bucket at the same time. Automatic reference point changing always relocates the reference point to the lowest tip of the bucket, according to its position.

In a loader and dozer the machine control system makes working more efficient and lowers material and fuel costs. With the system it is easy to make the construction layers to the required height in one go. In the end it is easy to collect the subsequent data with one touch of the screen.

Multiple training packages, using cloud services for the communication of the systems, and communication between the control system and service centre via wireless internet are among the firm's services. Remote support staff can instruct and solve possible problems without visiting the site, which saves time and money and minimises stoppages.

### Satisfied partners

Novatron started going international in 1995 when it made a distribution agreement with a Norwegian firm, Hella Maskin A/S. This also gave new buoyancy to product development and sales. A few years later Novatron started cooperation with German firm Moba AG, which is a mobile control

system supplier with nearly 500 staff in 15 locations in Europe, Asia and America.

Novatron's mission is to help its customers prosper by improving the productivity and quality of infrastructure construction. The vision is that Xsite offers the best solutions for the automation of mobile machines. Entrepreneurial attitude, good team spirit, openness and transparency are essential values to the company.

Novatron forms close and honest cooperation with its partners and every two years examines the satisfaction of clients and personnel. According to a study by Innolink, 99 per cent of clients are satisfied or very satisfied with Novatron's products and services. Ninety five per cent of personnel recommend the company as a place to work. At Novatron people work diligently but not strictly; everybody's point of view is taken into account and everybody is proud of what they do.

### Darekon has high expertise

Vaaramo is not shy in praising Darekon for seven years of cooperation, flexibility and quality.

"We grew rapidly and introduced many new products so we started looking for a new contract manufacturer in 2011," says Vaaramo. "The performance and capacity of the former contract manufacturer was not sufficient for our speed – we kind of grew out of our cooperation with them. We had to switch to a bigger one, get room to grow."

"Darekon's representative had already visited us earlier to introduce the company and was able to convince us. Soon after that we started developing our cooperation. First we had proto boards made and soon moved on to production series. The manufacturing numbers grew fast and



The Xsite PRO machine control system is full of intelligent resources. It allows an operator to handle large 3D models and view the plans from the machine's cabin. The system is operated with a few touches of the display.

Darekon has always been able to respond to our growth with high quality operations and fulfil our expectations. They have things under control or else it would not have been possible."

"At Darekon they have high expertise – the right people doing the right tasks," continues Vaaramo. "People are happy and brisk, working with the right attitude. They make good results and good products with a smile on their face."

#### **Cooperation advances continuously**

According to Vaaramo the operating conditions of Novatron's products are demanding, which is easy to understand. In an excavator or dozer there are vibrations and the sensors attached to booms occasionally take hard knocks. The environment is also variable as the devices are used in Northern frost and, for instance, in the Brazilian heat. The humidity varies a lot and temperature can vary several tens of degrees during a day.

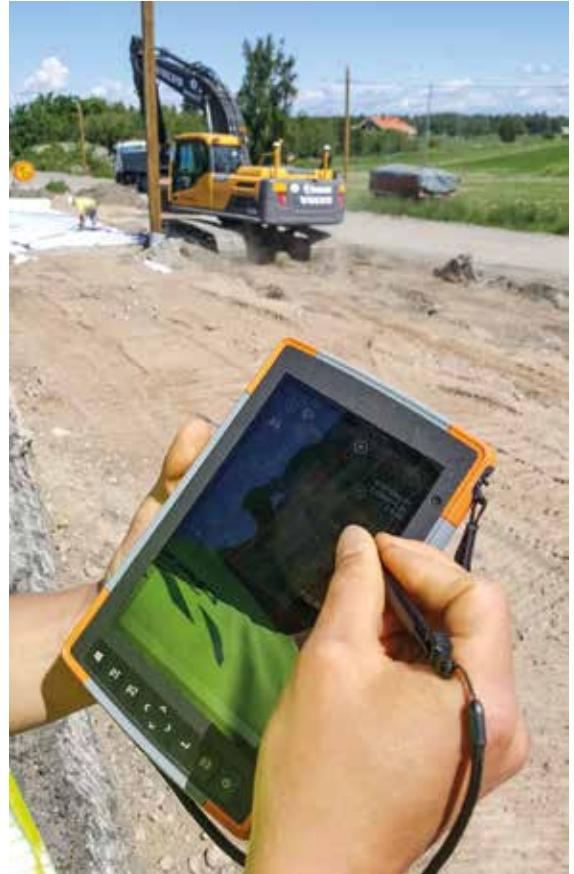
"The conditions set hard requirements for, for instance, soldering technology," says Vaaramo. "Many products also have special require-

ments, such as various strengthening needs. Many boards are varnished and some moulded in epoxy. Darekon makes some of these things and we make others."

"We have invested in our own final assembly of the devices so for the moment we don't have it done at Darekon. We, however, know about the possibilities in this respect and as production numbers grow, it is possible that we could move part of final assembly to them to do."

The volume of cooperation is considerable according to Vaaramo. Novatron has concentrated their electronics manufacturing with Darekon, which annually makes more than 10,000 units of various products. The 27-pole cable between the central unit and the display panel has been manufactured at Darekon's Polish facility for a long time.

"All of our supplier network has performed in an excellent way and been able to supply the components and products we have needed. Darekon's flexibility together with operation and execution quality deserve special thanks. We are both top experts in our fields," concludes Vaaramo. ■



Xsite PAD is a tool for surveyors and foremen. It includes the same properties as the Xsite PRO 3D machine control system, but the properties are adjusted for the needs of people responsible for the construction site.

## EVOLUTION – NOT REVOLUTION

# DAREKON IS ADVANCING WITH CONSIDERATION

Darekon's board member, **Harry Linnarinne**, analyses business principles, sustainable development and Darekon's progress. The Orpo brothers are decent people.

**H**arry Linnarinne has been Darekon's board member for more than seven years. He has a diverse experience of strategic planning, corporate management and working as a board member in Finland and abroad. Linnarinne is a Ph.D. of industrial engineering and management, and M.Sc. of electrical engineering from technical university, and M.Sc. of entrepreneurship from Helsinki School of Economics. At the moment he is working as Dean at the University of Vaasa.

### **Big is beautiful – or is it?**

"It is typical to think that 'big is beautiful,'" says Linnarinne. "Darekon, however, operates with a decentralised business model and our units are relatively small but very well matched together. We have been successful with the principle that our primary target has not been size yet we have decentralised and focused our operation. There are other operating models than those in academic textbooks."

"Darekon's progress has been calm and big, expansive steps have not been made with large acquisitions. Suitable businesses have been looked for with precise targeting and merged when there has been a good opportunity. The main idea is to operate close to the core – it makes continuous development possible."

Fast expansion also causes high expenses that can kick in later, according to Linnarinne. If the market then weakens, the expenses are still there and that can lead to a bad result.

Linnarinne also emphasises client focus: "A big acquisition easily takes up the time and energy of the management for two-three years, and the focus on clients can be lost. It is essential for the management board to keep in touch with the clients – there is no business without clients. If client focus is lost, then the game is over."

Darekon has been able to smoothly expand its client base however, which had previously been relatively centralised. Business is now divided across various industries, including both small and large clients. Also geographically Darekon has

both local and international clients. This minimises any risk since various industries operate at different cycles in economic trends.

### **Sustainability at the core**

Sustainable development and an environmentally friendly way of operation is an essential part of today's business and processes. Requirements are continually rising and expanding. Traceability, for example, is now a general requirement.

"Circulating waste materials and production side streams is today a natural part of all manufacturing," continues Linnarinne. "Partners receive materials that are valuable raw goods for them which they refine for new use."

Now, at the point of sourcing material, Darekon takes into account the circulation to side streams and minimisation of waste. This is also economically profitable. Minimising energy consumption is a natural part of the business.

The well-being of personnel is perhaps the most important part of sustainability which affects the business. Social sustainability means, for example, equality, fairness and community. All of these principles are documented in Darekon's management system and taken into use in all units of the company.

### **Contract manufacturer between the two fires**

"Price, quality and flexibility – that's a difficult equation that Darekon has been able to solve very successfully," says Linnarinne. "Customer relationships are, above all, a partnership and nowadays completely transparent. Darekon has been able to keep its promises. The conspicuousness of a manufacturer comes through its reputation and Darekon has a very good reputation."

"There is a continuous need for development in our industry, processes are brought forth and there is a lot of innovation at the manufacturing facility. It is essential that staff are allowed to bring up their opinions and new ideas. They will be taken up if they are good and feasible."

The management of Darekon is, in Linnarinne's opinion, instinctively close to the practical level of



Kai and  
Henri Orpo  
are very  
systematic."

operations, even if the company operates as a decentralised business. The CEO is in touch with everyday life – he is there at client meetings and also where the production is being done. He does not lead the company from a “boot-leather tower”. Everybody is in the same boat and everybody has important roles – managers the same as production workers.

### **Core competence and understanding the entirety**

“Managing a decentralised company is demanding and Kai Orpo has been able to master this very well,” continues Linnarinne. “Sometimes it looks like he doesn’t even need to say much and people understand. Here is the advantage that Darekon has; many stable elements, people that have been in the company a long time with sure, certain knowledge.”

Continual development requires investment, according to Linnarinne, otherwise it is not possible. It is important that the investments are planned and steady. It is not always necessary to get the latest and most expensive equipment, but solutions that fit the process.

“The manufacturing machine market is global and a smart buyer can make the right choices,” says Linnarinne. “Darekon has been able to acquire high quality machines that have the right quality-price ratio. It is always important to consider the entirety and we have succeeded well with this.”

“Darekon and its clients often operate in niché markets and this may mean special requirements for manufacturing. On the other hand – in manufacturing bulk products the margins are very low, special products give the opportunity to produce more added value.”

### **Where is the world going?**

Darekon has a clear direction for the future – the strategy and vision is unchanged. Possible changes in the firm’s markets are of course taken advantage of if possible, but the operation takes place

close to the core – Darekon does not stray from its focus.

“It is important to understand the megatrends,” says Linnarinne. “Energy, production methods, efficiency and environmental factors are essential. Altering power networks and energy storage are connected to the electronics industry. Digitalisation advances through many areas. Artificial intelligence is coming quickly to all processes and robotising increases – also at Darekon.”

“We have to feel the pulse of the changing world, anticipate and understand the change. We have to see the situation and needs of our client’s client. The earlier we figure it out, the better we can prepare.”

“Clients want us to integrate in their systems, which is good for both parties. It is always good if we can participate in defining the product at the planning stage. Services will be developed further and we already have, for example, ample logistic service models in use. More added value and broader value chains are the direction of our future development – yet thinking about our core competence at the same time.”

### **Evolution – not revolution**

“Everything has a history – we never start from point zero,” says Linnarinne. “It is good to look into the past, where do we came from. Change is inevitable but in the background. It usually takes 20 years from invention to mass product. In the University of Vaasa there are also big changes going on but they won’t happen if one doesn’t understand the background.”

“Kai and Henri Orpo have a clear view and the patience to do things right. They are very systematic and Darekon’s economy is taken care of with the same scrupulous care taken at home. With a hired manager the situation could be different. External signs do not highlight success and there is a healthy humbleness in the operation – but no fawning. That’s why it is nice to be involved in this company.” ■



Programming Amada FMS system is one of Arto's regular tasks at Klaukkala.



40 YEARS

# ON A MANY-SIDED METAL WORKERS CAREER

**Arto Riikonen** is a man with multi-talented uses at Darekon's Klaukkala workshop. Thanks to varied and engaging tasks he has thrived for 40 years in the same workplace.

Arto, who will be 58 years old in the autumn, has achieved a respectably long career, even if he never intended to work in a metal workshop. After military service in 1978 he started working at J Kantola Ky. Along the way the firm he worked for saw several acquisitions and name changes but Arto hasn't changed his job once.

## From sawyer to programmer

"After the tour of duty I needed a job and went to Kantola to saw pipes and practise with a 'chamfering machine', which was a mechanical press brake," says Arto. "After the new hall was completed I worked several years in quality inspection with a couple of other people. Then I moved to shearing, we sheared tons of plate every month."

"We had a big client in Kilo to whom we delivered a lot of material – everything carefully inspected. The client had a long row of acceptors and once again everything was inspected. No errors were allowed."

There have been so many acquisitions, new workshop halls and changes of name over the years that Arto can't recall them all. His workplace, however, has always been in Klaukkala, a short commute for him. As for thriving in his workplace Arto thinks the most important thing is that he has had many workstations and new tasks always feed an interest in the work.

"I was at least 10 years at the press brake and moved then to the Finn-Power FMS-system," con-

tinues Arto. "At the beginning I changed tools and fed the programs in the machine. Then I started programming the machine. After we got a new FMS system I was trained to program Amada."

## Vocational education and independent learning

In 2014 a new 3D coordinate measuring machine was acquired for Klaukkala for checking proto piece measurements, measuring sheet metal production samples and reception inspection of external milled products.

A large international client required formal training of the operator for the inspection documents to correspond to their standards. So Arto started vocational education at AEL and completed a three-year examination of 3D measuring while continuing to work. Today Arto is the most competent operator of the 3D measuring machine you could ever meet.

Learning how to operate an old Trumpf press required him to teach himself since nobody had mastered the machine after the main operator became ill and passed away. At the beginning it was tough to even start the machine but with the help of manuals and two workmates the machine has submitted to its operator's will.

## Arto visited Jyväskylä to be born

Arto says that as a child he lived in Maunula, opposite the shopping centre, which at that time

“

I never intended to work in a metal workshop.”



During one diving trip Arto found a plate from a wreck which, however, had to be handed over.



Today Arto is Darekon's most competent operator of the 3D measuring machine.

was a rough place. His parents were visiting a mother-in-law in Jyväskylä when Arto decided it was time he should be born and he was delivered in Jyväskylä central hospital.

The sea has always been an important diversion for Arto, who also used to dive when he was younger. Now his hobby at sea is mainly boating and Arto has a roofed motorboat in Kirkkonummi, right by the sea and a 20-minute drive from the boat club's island.

His family consists of a wife and two dogs, a cat and a horse, the latter of which is re-

portedly the wife's hobby. The retired trotter horse has a friendly character and every now and then somebody rides it. Jogging with the dogs is everyday exercise for Arto and he also swims whenever possible.

#### **Social Arto helps always**

"The best thing with the work at Darekon is the versatility of the tasks," says Arto. "I mainly operate the 3D measuring system and program Amada, but other machines don't resist or feel uncomfortable to use. When I move to some machine after a longer

break, it 'tick tacks' for a while and... how did it go...? But then it soon runs fluently again."

Arto describes himself as a social person who gets along with everybody and is happy to help if a workmate has something to ask about some machine.

"If you have problems, you have to dare to ask," emphasises Arto. "You must not have a false 'professional pride' so that you try to do something even if you are not sure how to. That applies to myself too. You have to have the guts to admit that you can't do something." ■

## **WONDERFUL WORKMATES ARE THE BEST THING AT DAREKON**



After many different tasks Eija returned to "paper work" at Klaukkala a couple of years ago.

**Eija Syrjänen** is one of the "pioneers" at Darekon Klaukkala facility who has worked at the same workplace for 40 years.

Eija started working in 1978 at Aspo steel service centre that was founded in Järvenpää a couple of years earlier. Various acquisitions and mergers have led to her current job at Darekon.

#### **The circle has closed**

"I started at Aspo at the computer department to handle sales orders," says Eija. "It didn't have anything to do with today's computing though. At one time the in-house planners programmed software and I travelled around Finland to instruct users in district offices. My last period in Järvenpää I was concerned with invoicing."

"After Aspo had acquired Kantola, I moved to Klaukkala, where I have had many tasks, from office and production to warehouse. I counted that, on the way, there have been eight different computer systems, 5-6 different companies even if I never changed job myself. There also must have been over 20

managers. Now the circle is closed since for the last couple of years here I have handled the sales orders."

#### **Eija is easy to inspire**

Eija describes herself as spontaneous and quick in her responses. She is also helpful and always good humoured. The reverse side is that she is sometimes impatient and does not like waiting. The time with Darekon in Klaukkala has, according to Eija, been good and all of the staff were reportedly very happy when nearly ten years ago Darekon acquired the Klaukkala operation.

Time has passed very quickly and various tasks have allowed her to enjoy that time. The best thing, however, is having wonderful workmates who affect one very much. Eija's career is close to its end but a date for her retirement has not been agreed yet.

However, we wish Eija the very best for a busy retirement! ■

DAREKON FOCUSES ON PERFECTION

# TRACEABILITY OF THE MANUFACTURING PROCESS AT A NEW LEVEL

Jari Aspereen explains how component traceability will help Darekon minimise even the smallest possibility of problems at an early stage.



Darekon has started using a laser engraving based system at its Haapavesi facility that makes it possible to identify each printed circuit board individually and authenticate production series and other information of the components mounted on it.

**T**he need for traceability is self-evident in electronics manufacturing. There is, however, a big variety in the realisation and accuracy of this vital need. To identify each individual board and the components mounted on it requires a state-of-the-art system and produces a huge amount of data.

#### Individual laser engraving from pile to pile

Realising traceability sets requirements for each link in a production chain. Towards the end of last year the sourcing department at Darekon informed component suppliers and made sure that they were able to deliver exact information for production series when delivering components.

The physical part culminates in laser engraving, where each blank and each board get an individual QR code. The code is a small square engraved with a laser on the surface of the solder mask,

where a camera can read the identification code of the particular board.

The engraving takes place with a separate device that takes the blanks from a pile, identifies and positions the blanks with machine vision, engravings the codes and moves the blanks to another pile. The machine can also turn around the blank if the code is needed on both sides. The engraving is done on the surface of the solder mask which it does not penetrate.

After engraving, the machine checks the result with its camera to make sure the code is successful and readable. It is also essential of course that the machine keeps a database of the codes it has made and always makes a new code on a new board.

#### PUI code includes necessary information

"When bringing the components into the tracking system there is the challenge that there is no

uniform standard of what or how the component manufacturer marks the packages," says **Jari Aspegren**, quality manager at Darekon. "That's why we have developed our own way of identifying the components."

"Our material department receives the goods and creates our internal PUI code (Package Unit Identification) for each package. The PUI code includes, as a rule, the production lot, quantity, our product code and MSL class – that means sensitivity for humidity. Some components must be soldered within 24 hours after emerging from air-tight packaging so they don't explode while being soldered, others can tolerate a longer period without getting humid."

"A PUI code is printed on a sticker that is attached to the package and exported to the database as an XML file. After the system comes online, all of our material will be PUI coded."

### **Assembly line and intelligent feeders**

All components loaded in the component cassettes for placement are identified. Intelligent feeders recognise, for instance, joints in component bands that often mean a change of production lot.

The blanks and boards coming into the placement machine for component placement are identified with a camera so the system knows exactly which individual board gets which components. If the camera is not able to identify a board, it will reject it.

All of the above applies to SMD components, but also the traditional components mounted after the SMD line are included in the system. The packages of manually mounted specific components are read with a bar code reader and the information is attached to the individual board on the table.

The physical laser-engraving machine is the most visible but only a small part of the entire system. Besides that the SMD lines are upgraded with cameras and intelligent feeders. Database servers together with their programs take care of storing the information and the functioning of the whole system needs a considerable number of sub programs linked together.

### **Flawlessness and avoiding problems**

"One can say this is about securing double security," continues Aspegren. "It is however crucial as many of the products we manufacture operate in critical environment and may secure high economical value or human lives."

"Electrical problems in components are rare compared to the number we use and even more rare is that any problems could get past all the checking stages in production. With this system we can, from now on, track possible risks related to component manufacturing lots. For instance in the car industry they accept no parts without the

possibility of complete traceability. To call back thousands of cars to replace a possibly faulty part costs astronomical amounts of money."

Aspegren presents an imaginative example of a client who has discovered a problem in a product and located it to a certain, possibly oxidised component. Components from the same 5,000-component package have also been used in other client's products, he imagines. The system allows the possibility of identifying every individual product where components from the same lot have been used and supports the process to ensure their functionality.

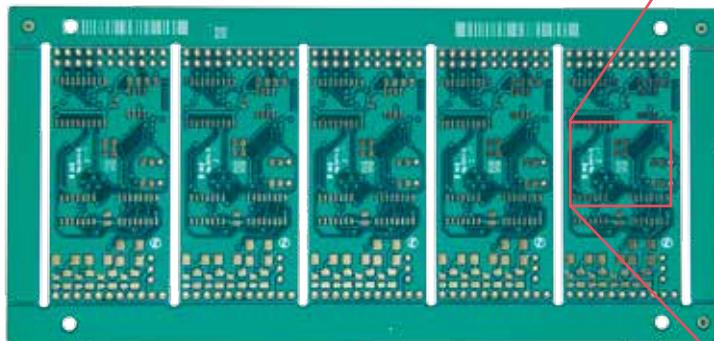
### **We challenge ourselves and our suppliers**

"Even if component problems are very rare, we want to minimise even the smallest possibilities for problems at an early stage," says Aspegren. "The possibility is minor, but if it takes place, it may cause enormous expenses. With this project we have challenged ourselves but also our suppliers and their ability to provide the necessary identification information."

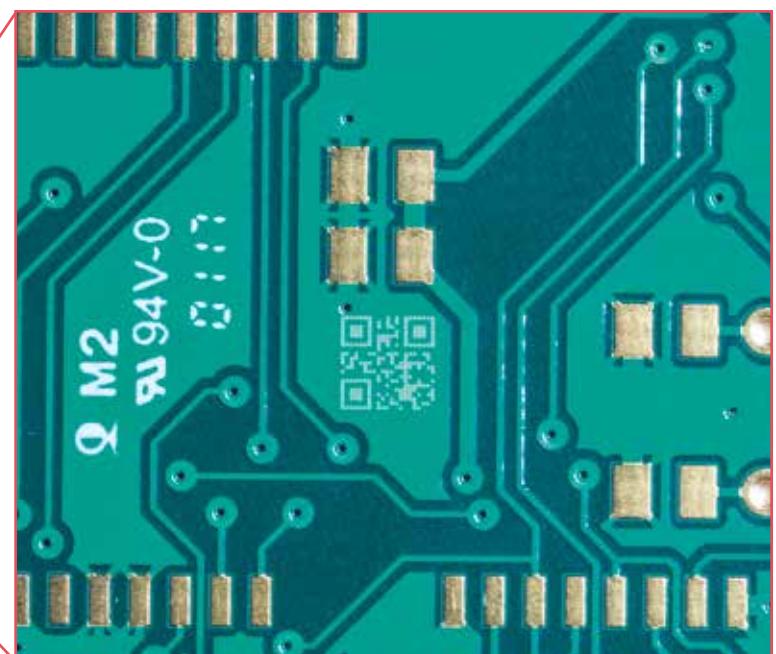
"The demand for traceability is increasing in many areas and we want to provide this option to our clients if they wish to have it. The cost for making the coding is negligible compared to the added value it may bring." ■



The PUI code created by Darekon's material department is read from component reel or package and the information is attached to every board where the particular component lot is used.



The PCB blank has, in this case, a 9-number barcode and an 18-number QR code identifying the boards included in the blank. The content of the code can be specified very freely.





Photos: Cuvava

# DAREKON KLAUKKALA IS A ONE STOP SHOP FOR DEVICE PRODUCERS

The Klaukkala manufacturing facility is a sheet metal workshop and a plant making final assembly of electronic equipment. But it is also a versatile planning office, robotised welding shop, logistics hub and much more.

**T**he Klaukkala unit joined Darekon nine years ago and since then a lot has happened. Synergy benefits have broadened production at the facility, resources have been allocated to development and continuous investment has improved productivity and opened up new possibilities.

## From sheet metal to full service

In Klaukkala they manufacture sheet metal products, a service Darekon had previously been without. In Klaukkala they were also used to making precise final assembly and manufacturing mechanical parts with exceptionally precise tolerances. This was a perfect match for Darekon which has, among others, significant clients in the medical equipment business.

After the company changed hands the benefits of synergy were quickly apparent and Klaukkala started to do even more competitive final assembly of products, for which electronics boards came mainly from Darekon's Haapavesi facility and other parts, for instance complicated cable harnesses, from the Polish facility. The arrangement has pleased many of Darekon's clients and opened possibilities for even deeper cooperation.

Now clients can have even more complete assemblies from Darekon and, at best, complete and tested products from the firm. The products can be packed in cartons printed with the clients' motifs and shipped with manuals and other documents – ready to send to Darekon's clients' client.

This makes running logistics easier and lowers expenses, as one partner can often fulfil the clients' needs.

## Electronics and planning know-how

Apelec – merged with Darekon five years ago – was a significant development in Klaukkala facility's operation. It brought new customers and significant new volume to the operation. Apelec had operated as an electronics contract manufacturer and most of its electronics manufacturing was moved to Darekon's other manufacturing facilities. Final assembly together with product development, service, logistics services and product management operate from Klaukkala.

With the acquisition Darekon got some twenty new employees and strong planning know-how. One example is Darekon's modular test tower.

Testing is necessary not only at the product development and production stage but also at the later part of a product life cycle, when it can have a surprisingly big impact. Having a standardised test system can prolong a product's life cycle for years.

The starting point of Darekon's testing system is a tester that always has the same basic structure. A tower with wheels is equipped with a standard set-up – a power supply, a computer, an oscilloscope and other measuring devices together with an interface for product specific adapters.

The adapter can be changed with the quick flip of a hand and it has an affordable purchase price.



A real train in Amada's automated warehouse moves plates to punching.



Measurements of a new production lot are carefully checked.



The new seal extruding system uses a Fanuc arm robot so it can also apply seals to multifaceted products.

The adapter includes integrated product specific characteristics such as loads, resistors and active characteristics.

### Better manufacturing with productisation

An essential part of Darekon's planning services is productisation planning with the main focus on developing better manufacturing technique for a product. Cooperation begun at the prototype phase results in a better and more economical product that can be put on the market sooner.

With Darekon the productisation service concentrates on efficient and economical productivity. It does not include consideration of whether there is a need or market for a product, nor of its intended purpose or the competitive situation.

When a client opens the discussion at the prototype phase, he will get feedback regarding manufacturing as early as possible. The manufacturer will see the whole life cycle of the product and roles can be specified as early as possible. That may include mechanical design, the choice of materials, packaging design and planning of logistics.

### Precision and productivity with investment

"At Darekon the principle is to make regular and reasonable investments that help to achieve the best and most economical result from the entirety's point of view," says Pekka Antikainen, plant

director at Darekon Klaukkala. "In Klaukkala we regularly acquire various smaller production machines and even remarkably big ones – like heavy presses and press brakes – that have a reasonable investment cost though."

"Our Amada laser cutter is one of the notable acquisitions of recent years and it has given us the opportunity to do things that we previously had to get done outside the house. Amada's two-kilowatt laser makes it possible to cut carbon steel that is up to 12 millimetres thick and the machine can handle well over meter-wide plates."

"Extreme performance is however needed relatively seldom as we often use the laser for cutting only 0.2 millimetres thick plate that is used for manufacturing shields with only a few millimetres dimensions to be mounted on PCBs. The important strengths of the laser are its high precision and ability to cut very complicated pieces."

### A new FMS system and robots

For handling larger and thicker boards there is an almost brand-new FMS system (Flexible Manufacturing System) consisting of two Amada sheet metal handling systems and an automated warehouse and load/unload system.

The new FMS system replaced an old system that was approaching the end of its life and the new system was a million-class investment. Ac-



Rauli Nikander presents Klaukkala's new three-spindle threading automaton.



A welding robot can drag seam ten times faster than a person.

cording to Antikainen the new machines are faster and quieter. The old machines were hydraulic operated and the new ones are servo driven so they punch softer. Power consumption is also considerably lower and they no longer need hydraulic oil.

The productivity of the machines is higher, they work long periods unmanned and programming is faster and easier. Even material is saved as the cutting direction is more flexible.

"Welding is one of the basic needs of our production and we make many such products where manual welding is not competitive," continues Antikainen. "So it has been natural to acquire a welding robot to which we have moved and are moving a considerable part of our welding. Several of our welders have been trained to operate the robot and the robot has not caused staff reductions. On the contrary, this year most of the jobs welded with the robot are new."

The benefits of a welding robot are emphasised in all products with long seams to weld. A robot can drag seams ten times faster than a manual welder - a speed that Antikainen considered hard to believe before getting the machine. The benefit of speed is underlined in welding aluminium as the part does not heat up so much and less tension is created.

"Another important robot cell, just put into operation, is a system for extruding seals to cabinet doors and similar products," says Antikainen. "The system accomplished with an arm robot is - if not unique - exceptional in any case. Typically there, a linear table is used to move the part under the extruding nozzle. The robot also offers the possibility of handling multifaceted products."

"These robots give us more competitiveness in producing cabinets and the possibility of replacing the expensive general purpose cabinets used by our clients with much more economical and purpose built cabinets."

### Busy with new projects

The past summer has, according to Antikainen, been an exceptionally busy one in Klaukkala. More than one major client is starting new and large projects. The result is a huge amount of new parts to manufacture and acquire, and a lot to organise.

"We have diminished our old inventories and made layout changes that have helped us release more than 200 palette places for new production," says Antikainen. "Space is needed - besides for temporarily storing large cabinets - for all supplies, fixing parts, penetrations, hinges, fixing plates and packages. The biggest cabinets are almost two metres long and each includes some 40-50 sheet metal parts. For one particular product we even acquired a nitrogen generator."

"We seem to have succeeded in our duty as we have got so much new business. During the summer people have been pretty much loaded with work and some maybe even a little stressed, but with planning we have managed it very well. Actual overtime has not been done but with our flexible working hours some have collected quite a few plus-hours. Some holiday arrangements have also been made for the entire staff according to our project schedules. The whole staff deserves a big thanks for their flexibility."

### Klaukkala is a logistics hub

The location of Klaukkala is good for transportation and Darekon has a large warehouse at the facility. Thanks to this the Klaukkala unit also operates as a logistics centre for Darekon. The important role of final assembly in Klaukkala also emphasises the wisdom of concentrating logistics there.

Products manufactured in Poland often come by truck over the weekend to Klaukkala, so transportation doesn't take up working days. Products from every Darekon manufacturing facility are handled in Klaukkala every day - incoming and outgoing.

"From this unit's point of view Darekon is a good and friendly master," says Antikainen. "The unit has been developed massively and strong investment has been made every year. Today we can offer all Darekon's services from 'one hatch'. Our location makes it possible for us to operate as the logistics centre for the whole company and especially in the Greater Helsinki region we can deliver goods to clients every day. And to some even several times a day." ▀



Darekon makes regular and reasonable investments."



Klaukkala's warehouse is the logistics hub for the whole of Darekon. They have just arranged more than 200 new palette places there.

# Sustainable business – sustainable development



ISO 9001  
ISO 13485  
ISO 14001

Contract manufacturing of medical equipment and industrial electronics. Continuous development with the customer at the heart, digitalisation and sustainability are the signs on Darekon's road as a contract manufacturer.

Profitable growth for over 30 years has been possible because the customer has always been number one. Motivated staff, versatile services and comprehensive quality management system help us to operate economically, flexibly and proactively.

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