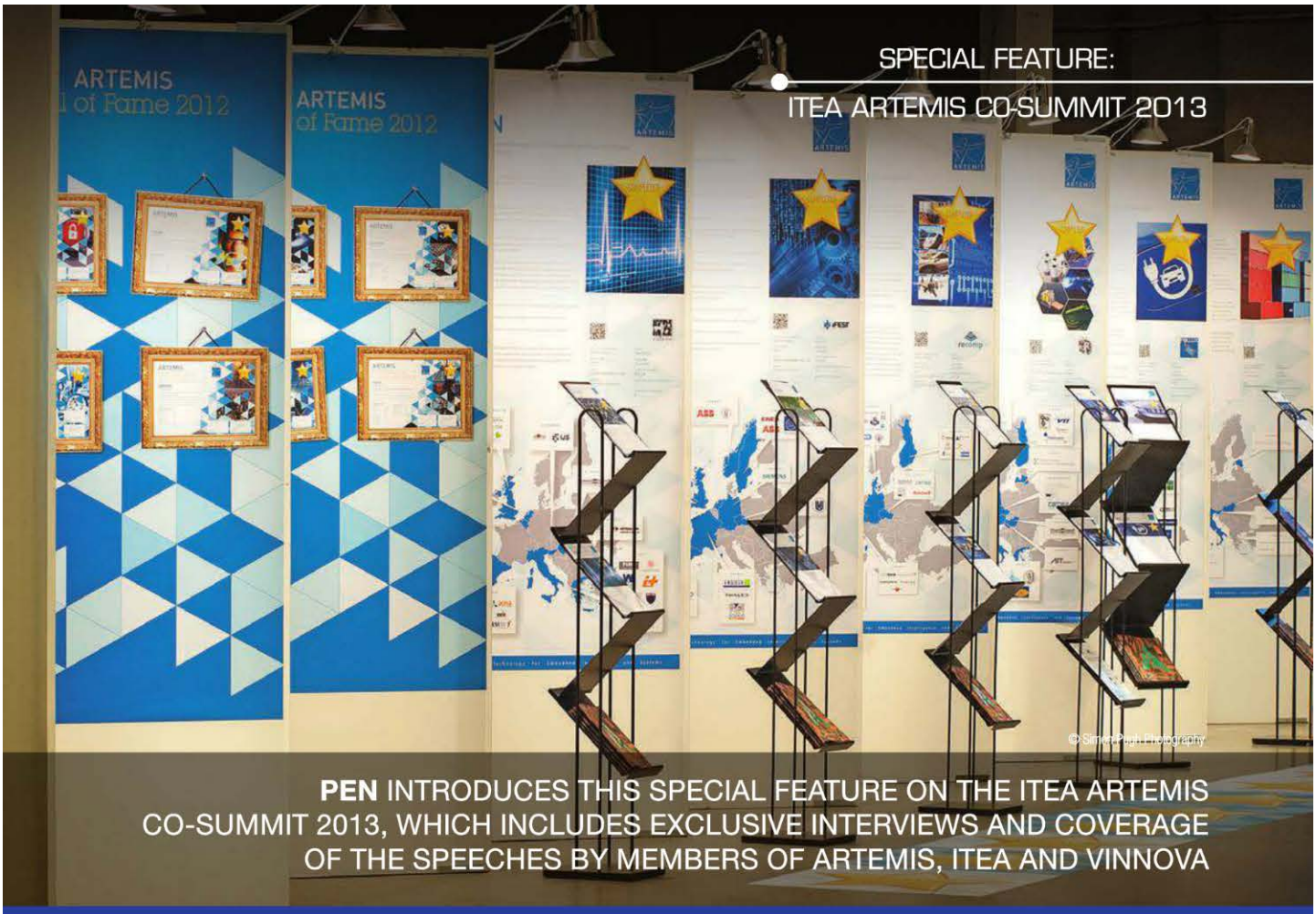

PEN INTRODUCES THIS SPECIAL FEATURE ON THE ITEA ARTEMIS CO-SUMMIT 2013, WHICH INCLUDES EXCLUSIVE INTERVIEWS AND COVERAGE OF THE SPEECHES BY MEMBERS OF ARTEMIS, ITEA AND VINNOVA

Reaching for the summit

The ICT industry, as well as ICT enabled innovation in non ICT industries and services, has come to make an increasingly important contribution to the growth of developed economies. Advanced automation is key to strengthening European manufacturing industries, enabling Europe to counter the employment shift to low wage countries. What is more, in European industry, the employment situation is becoming increasingly related to high education jobs, for example in the fields of research, innovation, sustainable production, transportation, logistics and services.

As such, the transnational innovative projects in ITEA – the EUREKA Cluster on software intensive systems and services – and by the ARTEMIS Joint Undertaking on embedded systems – are a significant factor in propelling Europe to boost its high tech industry and to maintain, upgrade and grow its employment to keep Europe prosperous.

The goal of the ITEA ARTEMIS Co-summit, 'Software innovation: boosting high tech employment and industry' which took place in Stockholm, Sweden, and was attended by Pan European Networks as the event's official media partner, was to create tangible business opportunities and thereby provide a significant boost to employment prospects in high tech related fields – therefore aligning it with strategic European priorities geared towards tackling the major societal issues of the coming decade.

ITEA

As a EUREKA Cluster programme, the ITEA (Information Technology for European Advancement) approach is intergovernmental, bottom-up, market oriented and industry driven. Following the EUREKA structure, each ITEA 2 project partner can apply for national funding in their own country, allowing a project idea to attract money from all participating countries. ITEA 2 is open to both large industrial companies and SMEs, as well as research institutes and universities.

Welcoming 700 delegates to the opening plenary of the conference, Professor Dr Rudolf Haggenmüller, chairman of ITEA 2, described the event as a crucial time in the history of the two organisations, stating: "For both programmes, ARTEMIS and ITEA, this is a very special moment – they both are coming to the

end of one phase, and beginning the start of another. For ITEA, it is the end of ITEA 2 and the start of ITEA 3; we enter this new phase with a refreshed body and soul. ITEA 3 will be an organisation that looks at the changes ahead of us.

"With ITEA 3, the time from idea to project will be ten months. A lot of work is ahead. ITEA 3 in a nutshell stands for fostering innovation and facing the high ground. This is our ambition; this is our spirit."

ITEA 2 stimulates and supports innovative and precompetitive R&D projects that will contribute research excellence to Europe's competitive Software Intensive Systems and Services (SiSS) sector. SiSS is a vital growth engine for Europe's economy and a key driver of innovation in Europe's most competitive industries – such as automotive, aerospace, communications, healthcare and consumer electronics. ITEA 2 and its predecessor have a proven track record with major achievements and results in these industries.

The current set of more than 150 projects (ITEA + ITEA 2), with more than 1,000 partners from 30 countries, has established a solid basis for further development. Many of these projects have led to the creation of completely new businesses.

ARTEMIS

Also speaking to attendees at the opening session was Professor Dr Heinrich Daembkes, president of the ARTEMIS Industry Association, who highlighted innovation as key to current times. He said: "We are here for the word 'innovation', which means change and getting results – making them transferrable and ready for application which is driving us. Yet we are also here to prepare the next steps for our future.

"You will see achievements in the exhibitions, and they are ready for use, ready for application. We are preparing the future in the many details that are shown in this exhibition, but it is also a co-operative event and has many workshops where we are preparing roadmaps and evaluating opportunities for growth."

Between 2008 and 2012, the ARTEMIS JTI has achieved 52 projects worth €935m with public funding of €448m involving more than 720 organisations (with more than 1,200 project participations) of which around 39% are SMEs, 33% large enterprises and 28% research organisations. In 2014 the JTI's ARTEMIS, ENIAC and EPoSS will join forces and merge into one stronger JTI called ECSEL (Electronic Components and Systems for European Leadership).

The Co-Summit presented a perfect platform for showcasing the results of the projects in terms of innovation, business and societal impact

One mission, two instruments

While ARTEMIS and ITEA may be two different instruments, they share the same goal as expressed in the title of this Co-Summit's theme, which is to create tangible business opportunities and thereby provide a significant boost to employment prospects in high tech related fields. This goal is therefore aligned with the strategic European priorities and geared to tackling the major societal issues of the coming decade. The targets are expressed in very concrete terms and hard figures in the 2013 version of the jointly formulated ITEA ARTEMIS IA high level Vision 2030, which sends a clear message of the value of software innovation and development to building a stronger European industry and more sustainable society, creating opportunity in key domains across the board. Central to this is the synergy created in the collaboration between research and industry, engaging the strengths of large companies and the speed and versatility of SMEs.

Projects

The Co-Summit presented a perfect platform for showcasing the results of the projects in terms of innovation, business and societal impact. A focal point, therefore, of the event was a major exhibition of the collaborative research, development and innovation embodied in some 65 ITEA and ARTEMIS projects along with other participants (such as different national competitiveness clusters, EIT ICT Labs and EC projects).

The Co-Summit was organised in co-operation with VINNOVA, a Swedish national body whose aim is to strengthen Sweden's innovativeness, aiding sustainable growth and benefitting society, and was supported by Ericsson and ABB.

This special feature on the event aims to cover some of the important issues raised, and includes interviews with, and coverage of, members of ARTEMIS, ITEA and VINNOVA, as well as Eloy Ortega, co-ordinator of the DiCoMa project.

Platform

The Co-Summit presents a perfect platform for showcasing the results of the projects in terms of innovation, business and societal impact. A focal point, therefore, of the Co-summit 2013 event was a major exhibition of the collaborative research, development and innovation embodied in some 65 ITEA and ARTEMIS projects along with other participants (such as different national competitiveness clusters, EIT ICT Labs and EC projects). In fact, this Co-Summit is the stage for the biggest exhibition of funded collaborative RD&I projects in Europe. This year, the exhibition also included a special focus area with projects related to the topic of 'Smart Cities'.

Vision

There is a wide consensus that from now to 2030 change and disruption will be permanent features in society, with the way of living and doing business becoming fundamentally different from what it is today. Digital technology has a major role to play in mastering the changes in Europe. An industry strong in software innovation is a prerequisite for maintaining global competitiveness and in securing high value jobs in digital technology and in other, more traditional industries that are increasingly dependent on digital technology. This view was echoed and amplified by the government and industry keynote speakers at the opening of the event. Daniel Johansson, State Secretary to the Swedish Minister for Enterprise, Energy and Communications, expressed how pleased he was that ARTEMIS and ITEA came not only as enablers but also as part of the solution.

The global market of digital technology is estimated at $3.3 trillion (~€2.4tr), corresponding to around 50 million jobs. The share of Europe in digital technologies is about 9.1million jobs. Europe's position is characterised by a strong presence in vertical markets. In Europe there are 200,000 jobs in hardware, including 100,000 in semiconductors, and 8.9 million jobs in software and services. Of these, 1.1 million are working in embedded systems. Within digital technology, ARTEMIS and ITEA are addressing innovation in software, IT services, internal IT and embedded software, collectively denoted as 'software innovation'. In other words, software innovation thus addresses a global market of around $2.6tr, corresponding to 44 million jobs.

Interaction innovation

Both ARTEMIS and ITEA have built innovation ecosystems of closely interacting companies and research organisations. These ecosystems are essential to enable European organisations, including SMEs, to keep up with the fast changing reality in digital technology, its increasing complexity and to remain at the forefront of innovation.

The 'high level Vision 2030 opportunities for Europe: the impact of software innovation on revenue and jobs' concludes that, regarding ARTEMIS, the R&D investments in digital technology by the vertical industries justify and require at least a doubling of the industry and public funding (by the European Commission and member states) investments in embedded and cyber physical systems RD&I.

What is more, the ARTEMIS industry priorities target reinforcing the strength of the EU industries, especially in the domains of commercial and professional technologies where Europe is still strong. However, it also reveals the recovery of EU industry positions by stronger use of digital technologies in all areas.

For ITEA, the high level ambition of seizing the high ground is a strong argument for doubling the investment in software innovation and, finally, an economic impact analysis on job creation and ROI through tax revenue fully justifies the doubling of industry and public investment in ITEA. The playground of business in systems and services based on software innovation provides a plenitude of promising investment opportunities.

Vital

Such opportunities are vital, according to European Commission representative at the Co-Summit, Werner Steinhögel, who confirmed that investment was being increased by 40% for Horizon 2020. Overall, the Commission welcomes and supports the joint position paper Vision 2030. In essence, then, this increase in investment in software innovation, although less than the doubling requested, is aimed at keeping Europe on a par with the rest of the world to sustain the benefits of digital technology for the European economy and society.

browse
www.artemis-ia.eu/cosummit2013_home

DURING THE ITEA ARTEMIS CO-SUMMIT, **PEN** MET WITH ARTEMIS'S **ALUN FOSTER,** WHO OUTLINED SOME OF THE JOINT UNDERTAKING'S SUCCESSES, AS WELL AS HOW HE HOPES IT WILL CONTINUE TO EVOLVE

Embedding excellence

Alun Foster is presently the acting executive director for the ARTEMIS Joint Undertaking and, since 1 August 2013, took on the additional role of acting executive director. Prior to that, he worked as an independent consultant for the ARTEMIS Industry Association, after serving the ARTEMIS initiative since its inception as senior manager for external technology co-ordination at STMicroelectronics, based in Zaventem, Belgium.

He has many years of industrial semiconductor experience in technical marketing, design and applications management for microprocessors, telecommunications devices and ASICs for the industrial and automotive sectors, and was responsible for co-ordinating strategic international co-operative research, for example under the IST and the EUREKA cluster programme MEDEA+.

He also actively participated in the ARTEMIS European Technology Platform (ETP) – an initiative of the European Commission contributing to the Seventh Framework Programme and a precursor to the ARTEMIS Industry Association – specifically involved in drafting the Strategic Research Agenda (SRA).

PEN met with Alun Foster at the ITEA ARTEMIS Co-Summit in Stockholm, Sweden, to discuss the event and the future of the Joint Undertaking as it continues to promote excellence in European embedded systems research and development.

Alun Foster

The 2013 Co-Summit has demonstrated how the software and embedded systems communities have grown and matured

How would you reflect on the discussions that have taken place at the 2013 Co-Summit? Do you feel that it has been a success?

The answer to that is a resounding yes, as it is already clear that the event has been successful on a number of fronts: in the first instance, the Co-Summit has demonstrated how the software and embedded systems communities have grown and matured. The summit has seen demonstrations from the ARTEMIS standpoint, showing the contribution of software innovations to the more general innovation capacity and competitiveness of many industrial players; the special focus area on smart cities has also proven to be incredibly interesting, and commonalities between projects have become clear. We have also been treated to some fascinating insights from the Swedish political world (where similarities across Europe are evident in terms of meeting the need of citizens).

Finally, we have heard discussions on how vitally important it will be to ensure that any technology used in smart cities is tested against reality, and, indeed, against the acceptance of the people for whom it is designed to work. Continuing on from this, it is clear that technology should not be seen as an end in itself – it must serve a purpose, and that purpose must be well defined. This can be achieved by working together and by including input from the political world.

Given the importance of the inclusion of policy makers in this area, are you able to actively link them to the work that you are doing in order to inform the decision making process?

We have to be realistic in our expectations on that front, in that the domain of a funding scheme such as ARTEMIS is research, and while we can discuss politicians' attitudes towards the research and development of new technologies

with them, I fear that it may be beyond our reach right now to make any major impact at the real decision making level.

However, within these models – which also applies to ECSEL, the new Joint Technology Initiative being prepared to replace ARTEMIS – we work with member states (who provide part of the funding), who provide us with contact points which we could possibly develop further (and this is only a distant possibility) to lead to better connections within the member states themselves.

Thus, while it might not be a direct ambition right now for ARTEMIS and, indeed, while it may not even be immediately achievable, we can at least try to lay the groundwork so that others, who become motivated by this story, can take up the baton and do that high level lobbying for us.

How have you seen your projects evolve?

The nature of our projects has shifted in many ways over the years, with some being more subtle than others. Perhaps one interesting example is in a new ARTEMIS project on e-health which included use of a psychologist to help define a test vehicle for the human interface element.

The inclusion of a psychologist may be just a small step, but it is a small step in the right direction. Indeed, it serves to highlight the importance of broadening our thinking about these projects, and thus to be a little less focused on our computers and realise that they are there to serve a purpose: Europe's citizens, whose behaviour with, and acceptance of, all these new technologies is crucial.

What does the future hold for ARTEMIS as ECSEL continues to develop?

ARTEMIS is a PPP, meaning that within the public sector there is the ARTEMIS Joint Undertaking, as well as the European Commission (who provide the EU funding), and the member states who all actively contribute to the programme. On the private side is the ARTEMIS Industry Association (who represent the R&D actors from large industries, SMEs as well as research institutes and universities).

For ECSEL, there is a strong motion to integrate the best features we can of ENIAC, ARTEMIS and the ETP 'EPoSS' to make a new programme which fully embraces all the technologies required to create competitive cyber physical systems.

> The main goal of the SIMPLE project is to research and deliver an intelligent, self-organising embedded middleware platform, with particular emphasis on the integration of manufacturing and logistics. SIMPLE will address the issue of supporting the self-organisation and co-operation of wireless sensors and smart (RFID) tags for federated, open and trusted deployment environments in the manufacturing and logistics application domains.

In the meantime, many ENIAC and ARTEMIS projects are still running, and these will therefore continue to be supported. However, it is my hope that the first projects to come out of the ECSEL Joint Undertaking will call upon results from ENIAC, ARTEMIS, and other prior projects (for example from ITEA, present at the Co-Summit today) to ensure they can channel the excellent results we have already achieved from a technology point of view in Europe into financial gains for the companies and people involved, and, of course, ultimately to the benefit of the citizens of Europe.

How optimistic are you with regard to the future prospects for European industry in embedded systems?

While the field of embedded systems covers a huge set of domains, there are some where Europe stands to have a significant impact, one of which is systems that require an extremely high level of reliability – be it in the automotive, aerospace, or health sectors, this refers to anything which is connected to a human being and their physical safety. Indeed, there is a very strong indication that the work which is being done by ARTEMIS can really put Europe on the map as being the quality reference for this kind of system.

Europe may also come to play a role in other domains as well, perhaps with regard to indirect users and the way that embedded systems can be used to improve Europe's manufacturing efficiency. Indeed one project, SIMPLE (which I know very well through my function as a programme officer), which is designed to address scalability issues in wireless sensor networks, has shown how it is possible to use this to improve industrial competitiveness.

By providing European manufacturers with this type of competitive edge, it is clear that not only will this provide a boost to the economy but will also enhance the job security (and thus the morale and productivity) of the workforces involved.

Alun Foster
Acting Executive Director
ARTEMIS Joint Undertaking

browse www.artemis-ju.eu

SMARTER MAINTENANCE

A smartphone interface, magnetic navigation technology, wireless communications, and cloud computing together can promote intelligent maintenance, bringing down costs and improving machinery uptime

The maintenance of industrial plant motors, pumps, rotating machinery with gearboxes and bearings, and control valves is essential to keep the processes running at top efficiency, avoiding costly failures and ensuring worker safety. Any new maintenance tools that can improve the effectiveness of maintenance to achieve higher availability and, at the same time, lower the costs of maintenance are well justified. To achieve high equipment availability, it is vital to detect faults early, schedule maintenance and carry out repairs before production is impacted. Maintenance staff therefore will need intelligent and timely information about the condition of the process equipment.

Many manufacturing industries, natural resource processing and power generation plants are complex operations that have tens of thousands of moving machinery components spread over a footprint of many hectares. There is a lot of walking for maintenance people and few, if any, know how to find every component that may or may not need repair. There is no easy-to-use or reliable roadmap to all process components and the current condition or history of each point is not known on the spot. Some process-critical components may be hardwired into a centralised analysis system that warns of impending failure patterns. That technology is well established and used where the cost of failure is high, but it is just too costly to equip all moving machinery with sensors and wires.

To make condition monitoring more comprehensive, less time consuming and less costly, Metso – a major automation system, control valve and service provider – is developing a new mobile condition analysis and maintenance application based on commonly used smartphones as portable user interfaces. The application makes the best use of a number of enabling technologies and standards including emerging magnetic navigation technology, low power micro-electromechanical machinery condition sensors, low power wireless Bluetooth communications and cloud computing access via a Wi-Fi connection to the internet. Metso is proceeding with this application to complement its well established online machinery condition monitoring technology. The new portable user interface extends the reach of hardwired systems (that are usually comprised of a few hundred monitored points) to thousands of accessible points. The sensors can be placed during a scheduled maintenance round and can be relocated at a later time. The new application supports Metso's strategy to make maintenance activities more effective and lower cost by utilising intelligent products, tools and services.

Maintenance terminal in your pocket

The concept of the smartphone interface is easy to understand. A maintenance worker will be given a daily maintenance task list determined by a computerised maintenance management system (CMMS). The user interface then guides the worker through the complex plant to the device to be inspected. The phone can be used to select necessary sensor measurements directly by a Bluetooth wireless connection. The sensor sends data using Bluetooth to a Wi-Fi gateway into the cloud service. The phone shows condition monitoring measurement trends from the cloud from previously installed condition monitoring sensors, or a portable sensor temporarily installed on the casing of the pump, motor, bearing or other component. This portability is a low cost way of extending the monitoring capability within a plant.

Monitoring and fault detection can now be done on demand, and there is no need to go to a computer terminal since the handset with all the necessary service tasks and communications channels is in your pocket.

The sensor signal analyses in the cloud computing network include sophisticated mathematical techniques, like spectral analysis, that are used in Metso's online and offline condition monitoring systems. The device or mechanical component is given a clean bill of health or a specific fault is identified and a service task is initiated. The task can be initiated by a maintenance worker, if a sensor analysis is abnormal or if the cloud determines that a service interval is due. The analysis data is passed along to the cloud for archiving and time trending to see if a problem is getting worse and may need attention in the future. After the action is complete, the worker scans the smartphone past a near field communication (NFC) tag on the portable sensor module. Alternately, a QR code can be read. When the action is complete it is captured in a cloud-based maintenance task database along with a photo, if needed. Subsequent inspections can be scheduled and displayed on the handset when it is due.

Magnetic signature navigation

How does the smartphone guide the worker through the complicated plant maze? Global positioning systems (GPS) don't work well indoors because of the interfering effects of the building structure. Instead, the new navigation technology used in Metso's application is based on reading a magnetic signature that is

The smartphone handset guides a maintenance technician through a complicated plant layout to a point where a service action is required

unique to a building's structure. The smartphone comes equipped with the necessary magnetometers. The principle is similar to a natural phenomenon whereby sea turtles and lobsters use magnetic pattern recognition to navigate their way in the ocean. The technology developed by a Finnish company called Indoor Atlas has been applied by Metso to navigate around industrial plants, power plants and mining operations. The magnetic signature of the plant interiors can locate a serviceable monitoring point with good precision. There is no more hunting around and wasting time. It also benefits newly hired technicians and third party maintenance contractors who may not know the plant's complex layout so well.

The technique is not affected by spurious electromagnetic interference by motors and other electrical equipment. The task of mapping is not time consuming as a plant magnetic signature map can be created in less than a day.

Sensor intelligence in the cloud

Portable and low energy mechanical condition sensing is also a cornerstone of the new mobile maintenance application. These miniscule sensors are based on emerging micro-electromechanical (MEMS) technology. One such device used in Metso's application uses acoustic emission techniques developed by Finland's VTT research and development organisation. The MEMS sensor analyses transient elastic waves created by sudden redistribution of stress in a material. This is a result of vibration stress patterns. Typically, a condition monitoring point includes vibration and temperature measurements. This capability can be extended to include miniaturised measurements of acoustics (for leak detection) light emissions, humidity, pressure, magnetic and gyroscopic fluctuations. These capabilities can be turned on and off as needed. The power consumption of these sensors is low so the battery life of MEMS sensors can be up to one year. The handset senses battery strength and can alert the worker if it should be changed. These communications are based on standard Bluetooth profiles.

The transmission of measured data to the handset is based on low power Bluetooth wireless communications. The intelligence derived from the raw sensor signals comes from the cloud computing network where the signal spectra and other condition monitoring techniques like envelope analysis is performed. That analysis turns a raw signal into actionable intelligent information.

The analysis tasks are somewhat like determining the health of your car at a repair shop, except these plant analyses are done wirelessly and with powerful cloud computing. In fact, MEMS acoustic emission sensors have already been tested in a moving car. The sensors have also been used to monitor stresses in a train moving at 300km/h.

This low cost and scalable mobile condition monitoring application promises to extend a plant maintenance department's analysis and service task capability to include many process equipment points that were not feasible before because of the high cost. It also streamlines the management of the regular maintenance route by quickly directing a worker to maintenance task point and making an intelligent assessment of the component's condition.

The application is now being tested at a mine site and a power plant in Finland. More details of how the product works will be revealed in the coming months.

metso

Mika Karaila
Research Manager
Automation

tel: +358 40 7612563

mika.karaila@metso.com
www.metso.com/automation

THEN ROLE OF ICT IN MANY SECTORS, INCLUDING THE FUTURE SUCCESS OF EUROPEAN SMART CITIES, FORMED THE BASIS OF A SPEECH BY VINNOVA'S **CHARLOTTE BROGREN** AT THE ITEA ARTEMIS CO-SUMMIT, AS **PEN** OUTLINES

Swedish innovation

VINNOVA, the Swedish Governmental Agency for Innovation Systems, is designed to strengthen Sweden's innovativeness, aid sustainable growth and benefit society, and invests some SEK 2bn (~€220m) per year, with approximately 200 employees, working from offices in Stockholm and Brussels.

The director general of the agency, Charlotte Brogren, who has over 15 years of industry experience gained through various management positions within research and development with the global electrical company ABB, most recently, as technology manager for ABB's Robotics Division, delivered a keynote speech at the ITEA ARTEMIS Co-Summit in Stockholm, where she highlighted how Swedish innovation is paving the way for a smart and sustainable future.

She began her address by positing several reasons as to why an innovation policy is necessary at the national level. Drawing on historical examples, she illustrated that the world is a constantly changing place – some 150 years ago, Brogren explained, a line of trees were planted in southern Sweden to ensure the future availability of materials for the Swedish navy. But 150 years later, when the trees were fully grown, timber of this nature was no longer required by the ship building industry.

However, the difference is that we are aware of this constant evolution. Indeed, Brogren revealed that the Forbes' current list of the top the 500 companies, is very different to the one that appeared just a decade ago, and this, she argued, was due to a lack of innovative approaches. She added that this, therefore, should be seen as just one of many reminders that "you have to constantly renew yourself, constantly innovate, when it comes to new technologies, because otherwise you will be outmanoeuvred by your competitors".

Sweden can be seen as an example of what can be achieved "if you dare to think outside the box"

Policy

Returning to the necessity of an innovation policy, Brogren argued that, even in Sweden, innovation is crucial to avoid stagnation and that, moreover, an innovation policy becomes increasingly crucial in the light of tougher competition from other countries, markets and sectors.

Highlighting the Swedish model, she continued: "We are therefore very happy that a year ago Sweden created several key initiatives in order to push forward the future innovation policy. This was a natural strategy for innovation, and VINNOVA is now one of the agencies that has the goal to implement this policy going forward. We focus on funding research projects designed to generate key results to help Swedish industry to become increasingly competitive, while simultaneously benefitting Swedish society."

Co-ordinated effort

Discussing the programmes underway in Sweden, the VINNOVA director revealed that the agency is well aware that future challenges, such as those concerning the ageing demographic, water supply and quality, and energy security, cannot be solved from a single scientific perspective, or indeed by a single company, government, or researcher.

"We have to start working in another way," she argued, and this will entail a combination of different disciplines, as well as skills from different sectors and the utilisation of different technologies into new applications. By bringing new levels of expertise from all over the world together, she said, these challenges no longer have to be seen as challenges but as "key opportunities for the business sector".

Focus

Brogren explained that all of these areas include a fundamental element of ICT: "In future healthcare systems, we have already seen that two thirds of the content is ICT-related; in attractive cities this

is 60%; while in competitive production it is 50%. ICT, then, is a key enabler which can be used to address many of these issues."

Providing her auditors with examples, Brogren outlined how a Swedish project in future healthcare systems is attempting to provide cancer patients with hospital level care at home instead of them having to spend long durations in hospital, which, of course, cannot be achieved without ICT.

"In competitive production," she continued, "it is now clear that the key is to push ICT further in order to optimise automation and provide new production systems, which, in turn, lower environmental impact, increase speed and quality, and lower operational cost. We have also seen that ICT is key to allowing the development of new types of business models, and, moreover, to allowing them to connect their production system to allow the right product at the right time at the right price."

Brogren added: "In the area of environmental care, ICT can be used in many ways to reduced waste. One example can be seen in the use of sensor systems for efficient water management. Looking at the wider concept of smart cities and the many and varied aspects required for their future success – for instance in the areas of transport and logistics, healthcare, entertainment, waste, and energy – ICT is a framework that can not only bring these elements together, but can also optimise them for the future."

Director general of VINNOVA, Charlotte Brogren, used her presentation at the Co-Summit to outline Swedish successes in ICT innovation

Seaport

The Stockholm Royal Seaport is also a prime example of where Swedish innovations in ICT are working for the future. The Seaport – an almost completely new city district in Stockholm with a very ambitious agenda regarding environmental, social, and economic sustainability – aims to provide those working in this environment with unique opportunities to co-create with a range of actors and stakeholders for an extended period, including the municipality, development companies, utility providers, IT companies, and most importantly, different end user categories representing living, education, and healthcare.

Closing her speech, Brogren reiterated the importance of ICT, adding: "We now stand to see a real explosion of ICT that can enable core new technologies to generate new opportunities for the future."

Sweden, she concluded, can thus be seen as an example of what can be achieved "if you dare to think outside the box", and, as such, was a perfect choice for the location of the ITEA ARTEMIS Co-Summit, which stands to contribute not only to the success of smart cities through their work on embedded and cyber physical systems, as well as sensor networks and the other challenges involved in helping ICT to achieve its true potential in a variety of sectors.

browse www.vinnova.se
www.artemis-ia.eu

ACCESS TO DATA FROM A VARIETY OF SOURCES CAN BE CRITICAL IN A CRISIS. PULLING TOGETHER THIS IN AN INTEROPERABLE PLATFORM IS THE DiCoMa PROJECT. **PEN** SPEAKS TO ITS LEADER, **ELOY GONZALEZ ORTEGA**

First responders

IN disasters, lives can be saved and damage mitigated by a rapid co-ordinated reaction from public services. However, while information can be gathered and shared via a multitude of inputs, from sensors in the field to data generated by the emergency services, making sense of this vast volume of data in an emergency situation is a challenge. Yet crisis decision making can hinge on timely analysis of such data.

Moreover, given how disasters can strike multiple countries and demand cross-sector responses – the exchange of information between countries and various bodies is increasingly important in driving crisis response.

The ITEA DiCoMa project is working to support decision making in a crisis, by developing an open disaster management platform for first responders. It is specifically looking to enhance the capabilities of those first to respond to a crisis – where timely decision making is absolutely critical. Pan European Networks spoke with Eloy Gonzalez Ortega at December's Co-Summit for ITEA and ARTEMIS held in Stockholm, Sweden on the strengths of the project, its ambitions, and how DiCoMa is set to advance in the future.

What are the aims and objectives of DiCoMa?

The DiCoMa project deals with disaster management – improving control management in an emergency.

There are lots of members in this project from many different countries bringing together various skills and expertise. For instance, Israel is heavily involved with the security aspects. The idea with the project is to try to develop control management; but with some unique characteristics, as opposed to the normal platforms that can be encountered nowadays. There have been many initiatives when it comes to disaster control management in Europe and in the USA. The European Commission has been supporting numerous projects at the international level. In addition, individual countries such as Germany have funded several initiatives and projects for disaster control management.


© Gregsintx

The unique selling point of the project is that we are trying to develop a platform that is interoperable and multilingual, as disasters do not stop at borders. In order to achieve this, the platform must be able to interact with different stakeholders that are not just in one country. There had been initiatives before to have a single platform for inter-relaying information from different actors within a region or within an area. However, this goes across borders in offering a platform that can actually be used by many kinds of stakeholders in many areas of the world, especially in regards to adjacent countries.

What are the strengths of the platform? How are you developing it to help those facing challenges posed by disasters?

In order to achieve these goals, the platform had to be interoperable; it had to be able to integrate different communication technologies and support different communication protocols. Semantics was a big part of the effort, but by no means the only one to realise the multiprotocol idea. In approaching the project we understood that we had previous experience on architectures that could address this challenge, since the original landscape was very similar to the ones seen in the past in other sectors: sensors in the field that collect information and provide data to applications in the back office making use of proprietary communication technologies and protocols.

For all practical purposes, what you have initially are vertical data silos. When you have to start exchanging information between the silos, you have to build point to point interfaces to exchange

data. Therefore, we are trying to radically change this incumbent situation, utilising our expertise and strengths in developing horizontal platforms in order to exchange information between different actors in these challenging domains.

We need to communicate lots of data in real-time or quasi real-time in highly uncoupled scenarios. The aim is to bring all the actors involved under one single platform, in one single place.

Through the project, we looked at how to build an interoperable platform, that through semantics and other technologies, can provide the end user with data and information coming from many different inputs (systems, services, etc,) Eventually we worked with partners from Finland, Spain, Turkey and Israel. We selected forest fires as the scenario for demonstrating the capabilities of the platform. The project has been working hard towards creating this interoperable platform, relying on powerful middleware engines for transmitting the data and also pushing forward and pursuing the concept of real-time services. These services work on top of the platform and are basically algorithms listening and acting on the flow of information. These algorithms assess the flow of data, the events and, through the recognition of certain patterns, they generate alarms and other outputs that are once again inserted into the platform. Then, some other system or service can consume that alarm or output and digest that information.

Alongside this, there is a control support system and decision support system being deployed. The advantage of the ecosystem being developed is that it is entirely decoupled and can be totally decentralised, so you can have different components and pieces all talking to each other with information being sent through the platform.

We have been working on connecting these components and pieces, integrating all the different sensors in the field with the applications and systems in the back office, developing new services in the process.

Moreover, social networks are another important source of information and input when it comes to disaster management and we have also integrated them with the platform. The fact that we have implemented this architecture gives us the possibility of not concentrating all the algorithms within one single system. The systems working together are inter-related to each other, sending information back and forth, taking some action, making some decisions.

In addition, there is another important component of the ecosystem which is the integrated simulator. We are bringing in simulation that can replicate the conditions in the field. For the current forest fire scenario, it allows prediction of the movement of the fire; how it will spread based on conditions such as the vegetation, the slope of the terrain, humidity conditions and so on. It continuously simulates these conditions, with the simulated information being published into the platform in a different data domain. Units can then practise and train with these simulated scenarios, but they can also use the data as predictions in actual disaster situations in the field, allowing them to make what-if analysis in real-time so that they can respond better to the crisis making decisions based on this information.

What distinct benefits does the platform offer – how can it help exchange of data utilising existing standards and platforms?

The platform has been developed with existing standards in mind, and it has the necessary tools to seamlessly provide interoperability with legacy applications and with newer platforms and systems based on service oriented architectures. As a matter of fact, the platform being developed within DiCoMa can be considered an evolution (and extension) of this SOA paradigm so that it contemplates the needs of the real time world.

In this sense, it relies on the existing request-response mechanism that is at the core of a service oriented architecture, but also incorporates a publish-subscribe mechanism that is necessary to convey information in real-time.

You can have this platform running in many different nodes with diverse processing capabilities, even the nodes in the field as long as they have some processing power. In this respect, a data concentrator situated in the field with processing capabilities can host this platform in its processor and by means of this, create an intelligent node there. All the nodes are seamlessly interconnected and they are sending information back and forth between all of them. So the platform sits on the low-level nodes in the field, sits on the data concentrators at a higher level and on the servers at the back office. And it integrates everything together for the data.

It appears relatively easy for public bodies and agencies to integrate; has there been much interest in the work from the agencies?

Since we are still working heavily in the project, we are not yet at the commercialisation stage. But we certainly have the tools in place to start communicating to all those who could be interested, such as fire brigades, city authorities, public agencies and bodies at the national level. We still have six months ahead of us and one priority – besides bringing together and integrating all that we have developed – is the exploitation of results.

Eloy Gonzalez Ortega
DiCoMa
Project Leader

browse www.innovationenergy.org/dicoma