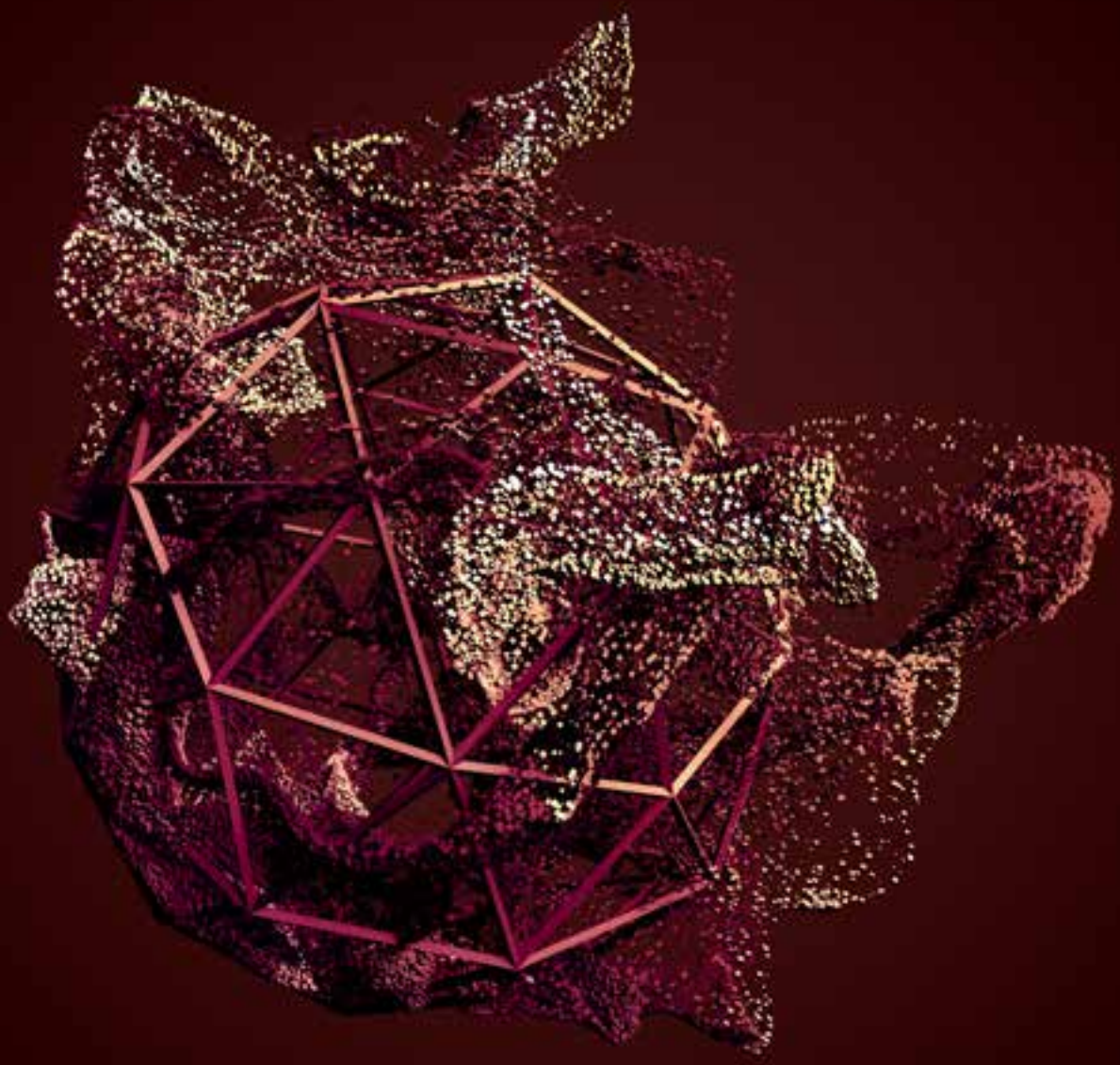
ARTEMIS MAGAZINE

December 2016 | No 21



Let us introduce our new president

CRYSTAL clear benefits for business

Leading the way, ladies first

AIOTI: Creating a dynamic European IOT Ecosystem

FOREWORD

Dear ARTEMIS friends,

We are very rapidly approaching the date of 17 January 2017, exactly 10 years to the day that the legal deed of execution was signed for the formation of ARTEMISIA (the legal name of the ARTEMIS Industry Association). Before 2007 ARTEMIS had already existed for a couple of years as ARTEMIS-ETP, which has been incorporated in ARTEMISIA since 17 January 2007.
During 2017 we will pay attention to our 10-year anniversary.

On 4 October the ARTEMIS-IA Steering Board designated Laila Gide as successor to Heinrich Daembkes as president of the ARTEMIS Industry Association. Laila has been very active in ARTEMIS since the early days of the ARTEMIS-ETP and is now the 4th president of ARTEMIS-IA, after Yjö Neuvo, Klaus Grimm and Heinrich Daembkes. We wish Laila every success and joy in serving our community and we thank Heinrich Daembkes for his energy and dedication during the last 4 years that included the construction phase of the ECSEL Joint Undertaking as successor to the ARTEMIS Joint Undertaking.

The first article in this magazine is an interview with Laila Gide.

Next is an interview with Wilbert Schaap, the Dutch PA in the ECSEL Governing Board, about what is happening in The Netherlands.

What follows is a double interview with Laila Gide and Zeynep Sarilar who became the chair of ITEA (as successor to Rudolf Haggenmueller) on 1 February 2016. In this interview an introduction is given to the new Digital Innovation Forum (DIF 2017), organised by ARTEMIS-IA and ITEA, that will take place in May as the follow-up of the well-known annual Co-Summit.

Then follows a report about CRYSTAL, one of the leading projects performed in the ARTEMIS Joint Undertaking, and then a report of the ARTEMIS Technology Conference that took place in October this year in Madrid.

Yves Gigase will inform you about the status of the ECSEL Joint Undertaking (reaching its third birthday), followed by a report of the ARTEMIS JU project COPCAMS and information about two ECSEL projects: MANTIS and SWARMS.

Finally, you will find an interview with Kees van der Klauw, the chair of AIOTI (Alliance for Internet of Things Innovation), which became a legal association on 23 September 2016. As "Internet of Things" is one of the three focus areas of ARTEMIS-IA, the Steering Board of ARTEMIS-IA decided to become a founding member of AIOTI. We hope for a fruitful cooperation with AIOTI for the best of our community and Europe.

I wish you an enjoyable read.

Jan Lohstroh
Secretary General of the Industry Association

CONTENT

WE HAVE A NEW PRESIDENT!

by CHRIS HORGAN

On 4 October 2016, Laila Gide, Director Advanced Studies Europe at Thales, became the new President of ARTEMIS-IA, succeeding Heinrich Daembkes who had been president since 2013. Laila Gide has been a major force in the Industry Association to date, chairing the Strategic Research Agenda Working Group that delivered the ARTEMIS SRA 2006 and its 2011 and 2014 updates, along with its latest 2016 version published during the CPS week in April 2016. In addition to her activities as member of the Thales Group Technical Board, Laila Gide is responsible for coordinating externally funded European research at Thales.

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PRESENT AT THE BIRTH

Laila is a familiar face within the ARTEMIS community. Hardly surprising really, when you think that Laila Gide was present at the 'conception'. She happened to be having lunch with ??? at the European Commission in August 2003 when the idea of the ETP for Embedded Intelligence first surfaced. You could say she was the right person in the right place at the right time. And ARTEMIS was founded – the acronym for Advanced Research & Technology for EMbedded Intelligent Systems, and also representative of the goddess Artemis, one of the most widely venerated of the Ancient Greek deities. Laila was asked by her bosses to take a role in this new organisation. "I was really enthralled by the topic and felt committed from the very outset. ARTEMIS itself was born in 2006 and the ARTEMIS-IA office became operational at the beginning of 2007. So we are looking forward to a birthday party in the new year!"

"I was given the responsibility of drawing up the Strategic Research Agenda, pulling together all the various contributions from the different members. Of course, I was assisted by many good brains around me – without them, I could not have done it. Many of the people I met and got to know at the time, and have worked with since, have been of great value to both myself and the community. A few are still around and are playing active roles today – they have been my companions along this journey."

FROM MODEST PROJECT TO SHINING LIGHTHOUSES

And what kind of journey has it been? What have you seen, experienced, learned? "It would be unfair to mention names, but suffice it to say that I have gained a lot of knowledge and experience from the many people I have got to know over the years within the ARTEMIS community. In the beginning, especially, I have to say that Finland and Austria were absolutely essential in getting ARTEMIS up and running, helping to organise all kinds of events, for example in Graz, Brussels and Berlin where the essence of ARTEMIS was established. Then came the projects. Initially,

these were fairly modest in size – after all, we were a rather new and 'untried' organisation – but nevertheless important. But once we started to embrace the 'think big' idea, it prompted the AIPP (ARTEMIS Innovation Pilot Project) approach with the scope and budget that had never existed before for Embedded System projects. CESAR, CRYSTAL and ARROWHEAD are now familiar names both inside and outside the community – their influence on the industry has been and will be quite significant. The rationale behind these AIPPs is that they incorporate the developments of previous projects to get innovation closer to the market. They have really shown the way forward. And now we want to take the next step by developing the ECSEL-JU Lighthouse concept. We are currently discussing which 'Lighthouses' can carry the AIPP into more ambitious horizons, looking from market, customer and consumer perspectives. The success of ARROWHEAD and CRYSTAL can serve as a foundation for the Lighthouse initiative."

STILL SOME GROWING UP TO BE DONE

So there are still challenges for the new president? "That goes without saying. Yes. First of all, if we can continue for another decade, that would be quite an achievement. And if we are to do that, we have to be able to adapt our mentality to all the changes that are occurring around us. It is not possible to grow without changing. Change is something we have to embrace. We should see the digital transformation that is happening as an opportunity. It is a bit like growing up. You change. And as our organisation heads into the 'teens', there is plenty of growing up to be done. And there will be times when we may not succeed, but without trying, you cannot succeed at all. I think that the challenges we face will be more structural than technological. We also have to be aware of the competition we face. We are not alone. We will have to fight to gain our place in a highly competitive world and help our members to stay ahead. We have to understand what kind of innovation is expected from us, what kind of new research and bright ideas we should bring."

'TRUST IN THE FUTURE'

And what about the political landscape? "The political landscape is changing constantly. It affects the economy, the funding, the needs. We have to respond to the needs, so we have to ensure that our structure can adjust its shape as these needs demand and stay sustainable in all kinds of conditions and climates – political, industrial, societal, technological. If I was to send a message to the community, it would be to trust in the future. Yesterday is not better than tomorrow will be. Of course, we have to remain vigilant. Some of the new technology might hinder our freedom and privacy. But while we have to learn to live with this changing world, we should also learn to enjoy it."

WHAT'S HAPPENING IN THE NETHERLANDS?

Interview with Wilbert Schaap

by **CHRIS HORGAN**

ARTEMIS Magazine 21 *December 2016*

In each ARTEMIS-IA magazine we highlight what is happening in the member states. In this edition it is the turn of the Netherlands, chosen to host the Digital Innovation Forum 2017.

Wilbert Schaap, is programme coordinator at the Directorate for Enterprise and Innovation at the Ministry of Economic Affairs. The Ministry promotes the Netherlands as a country of enterprise with a strong international competitive position and an eye for sustainability. The Ministry is committed to creating an excellent entrepreneurial business climate, by generating the right conditions and giving entrepreneurs room to innovate and grow. Here he brings us up to date.

TOP OF THE CLASS

In June 2016, the global innovation 2015 index was published and it featured the Netherlands behind Switzerland, the UK and Sweden but ahead of the United States as the fourth most innovative country in the world. And in the most recent World Economic Forum index, we are number four (after Switzerland, Singapore and the United States), so top dog in the European Union stakes. So why is this? "It's not only because of our very good R&D and innovation, but also with regard to our digital infrastructure, human capital, our markets and regulatory environment," Wilbert explains. "All these interrelated aspects converge to produce a very pleasing picture. Our own CBS (Central Bureau for Statistics) released just recently the latest figures on R&D in the Netherlands and reveals that we are doing better than last year, with 2.01% of our GNP (Gross National Product) devoted to R&D investment (almost 13 billion euros annually). The share of spending by companies is also increasing. It is around half of all R&D spent. But the Ministry still feels there is room for improvement here, because our aim is to get the R&D investment figure up to 2.5% by 2020. It is going to be a tough task, but we came from 1.9% in 2011, so the good news is that it is still going up."

TOP SECTOR SUPPORT

And why is that? "I think much is attributable to the Top Sector policy that we have here, nine sectors in which we excel worldwide, such as water, logistics, creative design and high-tech systems and materials. One of the goals of this policy is to ensure that universities, knowledge institutions, RTOs, companies and government cooperate very closely on innovation, trade/export and human capital – having the right people with the right skills in the right places. In terms of innovation, we have common research agendas, which are similar to the ECSEL-JU research agendas, and very clear targets – we want to get total corporate R&D investment up to five billion euros by 2025. We are heading in the right direction."

Looking at the cooperation, how important is it to work together not only nationally but also internationally? "We are the smallest of the large countries or the largest of the small countries – it depends on your perspective. Our annual budget for support for such cooperation is 40 million euros – split 50-50 for the EUREKA cluster programmes ITEA3 and PENTA and ECSEL – and this amount is purely for international R&D cooperation. It makes sense to invest in this, because if you can pool your resources beyond borders, it can mean a significant gain in efficiency and effectiveness. This means that your research can go deeper and wider as well as cheaper."

COLLABORATION IS KEY

ARTEMIS-IA is part of a very diverse landscape of innovative initiatives, funding schemes and support systems. This landscape has changed over the years from ARTEMIS-JU to ECSEL-JU, with ARTEMIS-IA focusing on Embedded Intelligence. "The role played by ARTEMIS-IA is an important one, because it facilitates European-wide cooperation. I think this will remain the case," Wilbert says. "Of course, politics change – we have elections this coming March – but the general view is that the Top Sectors policy is working and that the need for international cooperation will continue." The Netherlands is well known as a nation that functions on consensus – the polder model. "Quite so. Collaboration is key. Centuries ago we already understood that only by working together can we build the dikes that keep the water out! What is interesting to see is the growing trend of industry researchers that also teach at universities, bringing their very practical experience to the educational context. Such collaboration is a good way forward in bringing the fundamental and applied technology worlds together. And, of course, we have this collaborative environment at the High Tech Campus (HTC) in Eindhoven, also regarded as the world's most intelligent square kilometre. So it is no surprise that ARTEMIS-IA should have its office at the heart of this open research and innovation environment, where collaboration really does take place in practice on a day-to-day basis. It is in the DNA of the companies and organisations located there. Every time I visit the HTC, I see more and more companies springing up out of the ground, like shoots in a very fertile field of R&D. With such initiatives, as I suggested, we are certainly heading in the right direction."

LEADING THE WAY, LADIES FIRST

by **CHRIS HORGAN**

Hillary Clinton may not have succeeded in becoming the USA's first female president, but the list of recent women achievers, elected to high office not because they happen to be women but because they have all shown their suitability to lead, still includes illustrious names like Merkel, May, Gide and Sarilar. Women being at the top is indicative of a century of change – in education, culture, society, technology. Indeed, change is a central theme in the tête-à-tête with Laila Gide and Zeynep Sarilar, the respective President of ARTEMIS-IA and Chairwoman of ITEA, as they consider their new roles and the successor of the Co-summit, the forthcoming Digital Innovation Forum in Amsterdam in May next year.

Laila Gide was elected to succeed Heinrich Daembkes as President of ARTEMIS-IA in October, while her ITEA colleague was afforded the same honour earlier on this year. They have, therefore, both been charged with good housekeeping, in the best sense of the word! Zeynep feels both proud and honoured to be filling her role as Chairwoman of ITEA at a time of real change, especially in terms of the dissolution of borders and reaching out to a truly global community. "It is a great feeling to be able to champion the ITEA community. And, of course, a great responsibility. But I'm fortunate in getting good advice and guidance from the people within the community. Because although the organisation is in pretty good shape, there is still much to do, with the companies and the public authorities in a growing community. So as we go forward, I realise how important it is to advance as a team."

NOT A MALE OR FEMALE THING BUT APTITUDE

Laila echoes these sentiments and adds, importantly, that "being a woman had no influence on being elected to this position. It is a question of being the right person for the role. But the fact that a woman should be leading ARTEMIS-IA is more a statement of the trends we have witnessed in the past twenty or so years, especially in education where more and more women have been making their mark on the world of technology. Firstly, in terms of engineering and technology studies, and then increasingly taking jobs in industry that had previously been very male dominated. The division of roles is no longer as clear-cut as in the past. At Thales we see many more girls joining the company in the software engineering area and it is no longer a surprise to see women heading up technology companies or projects."

Zeynep agrees and adds that "it is not a question of being male or female, but it is more a matter of aptitude – being able to find a solution. The prowess is not physical, it is mental. And so the old divisions of labour, particularly in modern technology, which is dominated by software, have well and truly disintegrated. And in terms of being a role model, it is not something I try to actively be, but I am certainly aware of it. I realise that my achievement, if you wish to call it that, can serve as an encouragement to women to pursue their goals and know that gender should not stand in their way." Laila admits that while she received congratulations from both men and women, a few of the female contingent did express their pleasure in her becoming President. For both, the role is not only an important one, but also a demanding and energy-essential role. Neither woman underestimates the challenges that lie ahead, but both are committed to creating the conditions for the organisations to flourish. "I think people might be expecting more from us," Laila concedes. "I do not know if that will actually be the case, but being a 'novelty' tends to create expectations."

STRONGER COLLABORATION

"I certainly look forward to improving the level of collaboration between the two organisations," Zeynep says of her own expectations. "And increase the value of our two communities to the European software industry. So if we are to achieve this, our strong collaboration is a necessity." Laila subscribes to this notion in full. And one of the key developments, especially in terms of the collaboration that has always been a characteristic feature in the past, is the new Digital Innovation Forum in May. "We felt that the time was right," Zeynep says, "to take a different approach. To go beyond what we had done in the past and create an environment for discussion and ideas, and to broaden the scope to a more

global participation." Indeed, the new name represents the new approach very well. "Digital – that is the clear focus we both have as organisations," Laila explains, "and Innovation underlines the fact that we want to look beyond research at all the aspects that make up this vital component of our industry. Forum – it is a place where people come and meet and share knowledge and ideas. Also, with the new name, we are, as Zeynep suggests, looking to widen the scope beyond our two initiatives."

ECOSYSTEM

So, it is quite evident that the DIF is not simply a renaming of the familiar Co-summit – it will be an event that takes the collaboration to a different and more expansive level, one in which the appeal will spread to more explicitly include SMEs and start-ups and embrace a wider geographical focus. After all, the digital world is not one that is bound by borders. "We want this event in Amsterdam to be all-inclusive," Zeynep emphasises. "So we want to invite not only the industrials, SMEs and public authorities, but also venture capitalists and start-ups." Laila adds that 'ecosystem' is the key concept here. "The ecosystem is central to our ambitions. For the very dynamic and innovative start-ups to be able to play a full and fulfilling role, they need to become part of an ecosystem that also offers the capital and human resources they need. So this forum will provide a context for exploring how the ecosystem can support the actors involved and how they can help strengthen it. You know, it is always the first few steps that are the hardest ones to take. Not only for the start-ups, but also for the big groups that have to move towards the start-ups. We aim to achieve more over two days than would normally be achieved in several weeks."

CRYSTAL CLEAR BENEFITS FOR BUSINESS

by CHRIS HORGAN

ARTEMIS Magazine 21 *December 2016*

CRYSTAL, an ARTEMIS Innovation Pilot Project, came to an end this summer – a very conclusive end, as the business benefits of seamless collaboration via standardised and open integration of engineering tools were clear to all. Crystal clear.

THE CRYSTAL PROJECT – A RECAP

In June, 2013, the ARTEMIS Magazine (issue nr. 14) published an extensive article on CRYSTAL (CRitical sYSTem engineering AcceLeration), citing its aims "to reduce system design costs through the improvement and smart integration of system analysis, safety analysis and system exploration tools. In alignment with the RTP and IOS concepts, this leads to a reduction in development cycles and consequently a reduction in development time and effort." With a multi-domain focus (automotive, aerospace, rail and healthcare), the needs and challenges were identified for establishing and pushing forward an Interoperability Specification (IOS) as an open European standard for the development of safety-critical embedded systems. Tool integration to date has often been an ad-hoc affair in which proprietary bridges are created between each pair of tools. Such an approach does not scale, since the number of required bridges grows exponentially with the number of employed tools. Moreover, the resulting tool chain becomes extremely vulnerable to common changes like version upgrades from tool vendors, and the efforts for maintaining a large set of bridges is sooner or later no longer acceptable. So CRYSTAL set out to provide open and common interoperability technologies supported by the different tools that generate and provide access to data covering the entire product lifecycle. Having a strong industry orientation was a cornerstone of the project's development of ready-to-use, mature technology-ready integrated tool chains, building on the results of successful predecessors like CESAR, SAFE, iFEST, MBAT on European and national level.

FLEXIBILITY FOR ALL

CRYSTAL's goals were ambitious and the results will have significant economic and societal impact, with improved and smart integration of system analysis, safety analysis and system exploration tools enabling OEMs to benefit from better supplier collaboration and reduced system design costs. In addition, the CRYSTAL IOS will increase the flexibility for all stakeholders in the value chain and could have a substantial impact on the market worldwide. OEMs can easily combine tools from different vendors, and tool vendors will be able to find new market opportunities in an open and extendible environment. The average citizen will benefit from more innovative products and services of a higher quality and availability at lower costs. In the near future, we can expect significant advances in all the targeted domains. Examples are all kinds of innovative healthcare products, autonomous driving and increased safety in all transportation domains including light and heavy-duty vehicles, aerospace and the rail sector.

AN ENGINEERING DELIGHT

From all kinds of perspectives, the results of CRYSTAL are a boon. For example, engineers want to use the tools that are most suitable for their work without being inconvenienced by having to make the data consistent or by inefficient processes. CRYSTAL offers solutions that tackle the problems that engineers encounter. IOS enables everyone to use their own tools with proprietary data formats but the tools can understand each other's data. So to switch from your current tool to another tool is easily done! Bola Rotibi, Research Director of Creative Intellect Consulting, commented: "Can you imagine what kind of tools would be possible if the IOS would be applied industry-wide? The seamless integration of tool chains will be facilitated, new tools adopting the changed conditions will arise, and the complexity of the development process during the whole product lifecycle will be efficiently manageable." When more information is available for everyone in the engineering cycle, more transparency is created and better decisions can be made. Not only does this mean a more efficient design process, but also less (re-)work for the engineer. IOS enables early collaboration in the development process. This results in early detection of errors that were previously only discovered later during integration. And even across projects, data can be reused and shared when the IOS is implemented. Incremental development can therefore be achieved with less effort.

Equally, the main concerns of a process, methods and tools manager are efficiency and effectiveness. With the multitude of tools and methods applied throughout various projects and the sharing of data across lots of processes, it takes time to manage the complete system engineering environment. The CRYSTAL solutions reduce this tool management time. The IOS provides a tool-independent language, which makes it possible for different tools to share data in an efficient way. As Dr. Jürgen Schwarz, Daimler AG's Senior Manager for Safeguarding Hard- & Software, says, "The IOS reduces the effort to integrate tools into customer-specific tool chains and enables new applications with improved usability to support our engineers on the job."

INTEROPERABILITY AND STANDARDISATION

From the other side, a software tool vendor wants to run a healthy business, so increasing an installed base or margin is a natural objective: unique tool features and level of integration attract new customers. However, system engineering environments are evolving rapidly and customer tool integration requirements are becoming more stringent with the increasing adoption of model-driven

system engineering and the need for shorter development cycles. Interoperability is a key customer satisfaction issue that cannot be solved with good support alone. As CRYSTAL shows, many leading vendors have reached the turning point where they adopt a standard for handling interoperability. "Today's challenges in safety-critical systems engineering cannot be addressed by just one single-vendor tool chain," explains Christoph Bräuchle, Development Director of PTC, "because of the multiple engineering disciplines that are involved in the development process of such complex systems. A truly interoperable tool chain addresses the specific needs in each engineering discipline through best-of-breed capabilities while ensuring seamless integration of the results."

Standardisation is therefore essential for the IOS to make the results sustainable beyond the CRYSTAL project. How is CRYSTAL important for the standardisation bodies? OASIS is the standardisation body that maintains OSLC. The CRYSTAL project has helped to gain critical mass for OSLC in the safety critical systems engineering domains and as more and more users and developers experience the advantages of OSLC, word will go around and OSLC will become a well-accepted standard in the systems engineering community. The Modelica standardisation body supports FMU. CRYSTAL made many new companies aware of and active in using FMU. It has already been successfully adopted in automotive and aerospace domains and is being expanded to rail and healthcare. CP-SETIS is the organisation that promotes IOS results. For CP-SETIS, CRYSTAL and the related ARTEMIS projects CESAR, MBAT, iFEST, EMC2, DANSE, D3COS, HOLIDES are the main source for the IOS and the proof of industrial viability. CRYSTAL also provided the system engineering community with a library of samples and recommended engineering workflows using the IOS.

BUILDING ON RELATED ARTEMIS RTP PROJECTS

If you have been involved in a previous ARTEMIS RTP project, you want your results to be picked up by follow-up work like CRYSTAL and brought to a higher level of advancement and adoption. Also, the ARTEMIS Industry Association wants to build a coherent set of solutions across projects that support system development of Embedded and Cyber-Physical Systems. As with any EU collaborative project, the consortium collaboration is temporary, but in practice, the projects give rise to much subsequent industrial collaboration. After projects end, the results run the risk of quickly becoming outdated. To combat this, the ARTEMIS programme stimulates clusters of projects that build on top of related projects. In that sense, CRYSTAL was built on the shoulders of CESAR, MBAT, MODELWARE, iFEST, DANSE, D3COS and SafeCer. As some of the precursor projects had a specialised focus, CRYSTAL expanded this to the full scope of systems engineering and the system lifecycle. So the previous results were not only reused, but also expanded.

The catalogue of interoperable tools called the RTP was already started in MBAT and CESAR, further developed in CRYSTAL and published with the Platform Builder. More and more tools have been adapted in CRYSTAL to expand the interoperable tool library. CESAR already selected OSLC as the key interoperability principle for the Interoperability Specification (IOS), which is fully elaborated in CRYSTAL, whose critical mass helped to turn the IOS into a standard.

RESULTS IN BRIEF

+ **CRYSTAL Interoperability Specification (IOS):** an open specification that enables the seamless integration of engineering tools and the full traceability across the entire product lifecycle.
+ **IOS – Compliant Implementations:**
  - extensions and adaptors for their engineering tools,
  - SDKs to support the adaptor development process,
  - a Platform Builder to support the specification and instantiation of System Engineering Environments.
+ **Use Cases & Demonstrators:** use cases in all targeted domains are available and provide answers to the project challenges. Furthermore, the use cases serve as a blueprint to solve related interoperability challenges. In order to foster wide exploitation, CRYSTAL also produced a set of **Public Use Cases** which are available to organisations that are external to the project.
+ **Technical publications:** an impressive number of technical publications can be found on the website http://www.crystal-artemis.eu.
+ **Community building:** CRYSTAL brought together experts from industry (board members, CTOs, marketing directors, technical experts) and successfully promoted the technology.
+ **Higher level of awareness:** CRYSTAL initiated and contributed to several dissemination actions in order to raise the level of awareness and to get the involvement of the relevant stakeholders, in particular through the series of co-organised events called Interoperability Conferences.
+ **Standardisation:** with the contributions of CRYSTAL, it was already possible to achieve tangible standardisation results.
+ **Sustainability model:** a sustainability model for the IOS has been devised to foster the industrial uptake after the end of the project.
+ **Creation of ecosystems:** CRYSTAL actively supported the creation of eco-systems that create and govern open standards (e.g. OSLC, FMI, ASAM) based on the developed specifications.
+ **Collaboration with CP-Setis:** to coordinate IOS-related activities, especially the formal standardisation including General Engineering Methods and further extensions of the IOS.

ARTEMIS TECHNOLOGY CONFERENCE 2016

by AD TEN BERG

ARTEMIS Magazine 21 *December 2016*

ARTEMIS TECHNOLOGY CONFERENCE & PRE-BROKERAGE

The combination of the ARTEMIS Technology Conference (ATC) with a Pre-Brokerage was initiated for the first time in Turin last year. What some of you may remember, is that ARTEMIS-IA members have already been organising Technology Conferences since 2010, with a first edition in beautiful Budapest organised by the project partners of SCALOPES, INDEXYS, CESAR, SYSMODEL and hosted by AITIA & BME. This tradition of presenting the technological results of the ARTEMIS projects continued each year in different forms and was organised by other projects. Starting with the ATC in 2015, the programme was extended with extra keynote speakers, full-day workshops and an element of a Pre-Brokerage. The enriched programme also resulted in an increase of participants. This year the 3-day conference was visited by 160 guests, mainly ARTEMIS-IA members, but we also welcomed 14% non-member companies and research organisations.

PROJECT WORKSHOPS

In line with presenting project results with a focus on technological achievements, at ATC 2016 the projects Arrowhead, EMC2, R5COP, ACCUS, and CP-SETIS organised a half- or full-day workshop. The Arrowhead project presentation highlighted several subjects including "Plant automation systems in the cloud" and "Protocol translation", followed in the afternoon by several demo deployments such as "Arrowhead plant automation". That same morning, CP-SETIS presented its structure and status of the Interoperability specification IOS, building on the history of previous ARTEMIS projects, highlighting the "CRYSTAL Automotive Use Case" and showing the options and benefits of setting up an IOS Cooperation Forum. After an enjoyable lunch, the vision behind ACCUS (Adaptive Cooperative Control in Urban (sub) Systems) was presented by six project partners, with Energy Management as one of the subjects presented. On the next day, both EMC2 and R5COP presented their project results and demonstrator models. Application Innovation by EMC2 is based on improved performance, lower cost and energy efficiency of multi-core applications. Particularly interesting were the EMC2 – Arrowhead project synergies presented by the WP1 with subject SoA System Architectures. Various robot interactions, based on "Advanced and experimental human-machine interfaces" and "Augmented Reality", were demonstrated by R5COP partners PIAP, BME and Probot in the afternoon.

PROJECT TRACKS

Parallel to the Workshops, shorter project tracks were given over the course of two days. In this ATC edition, the themes of these half-hour presentations were: Smart Cities, Smart Energy, Manufacturing, Mobility and Future CPS. Each presenter provided information about their technological challenge, their solutions and application examples of technology used. The overview of the project, coming from different funding programmes, provided a very interesting insight into the joint challenges and the different solutions, which led to an engaged audience and lively discussions.

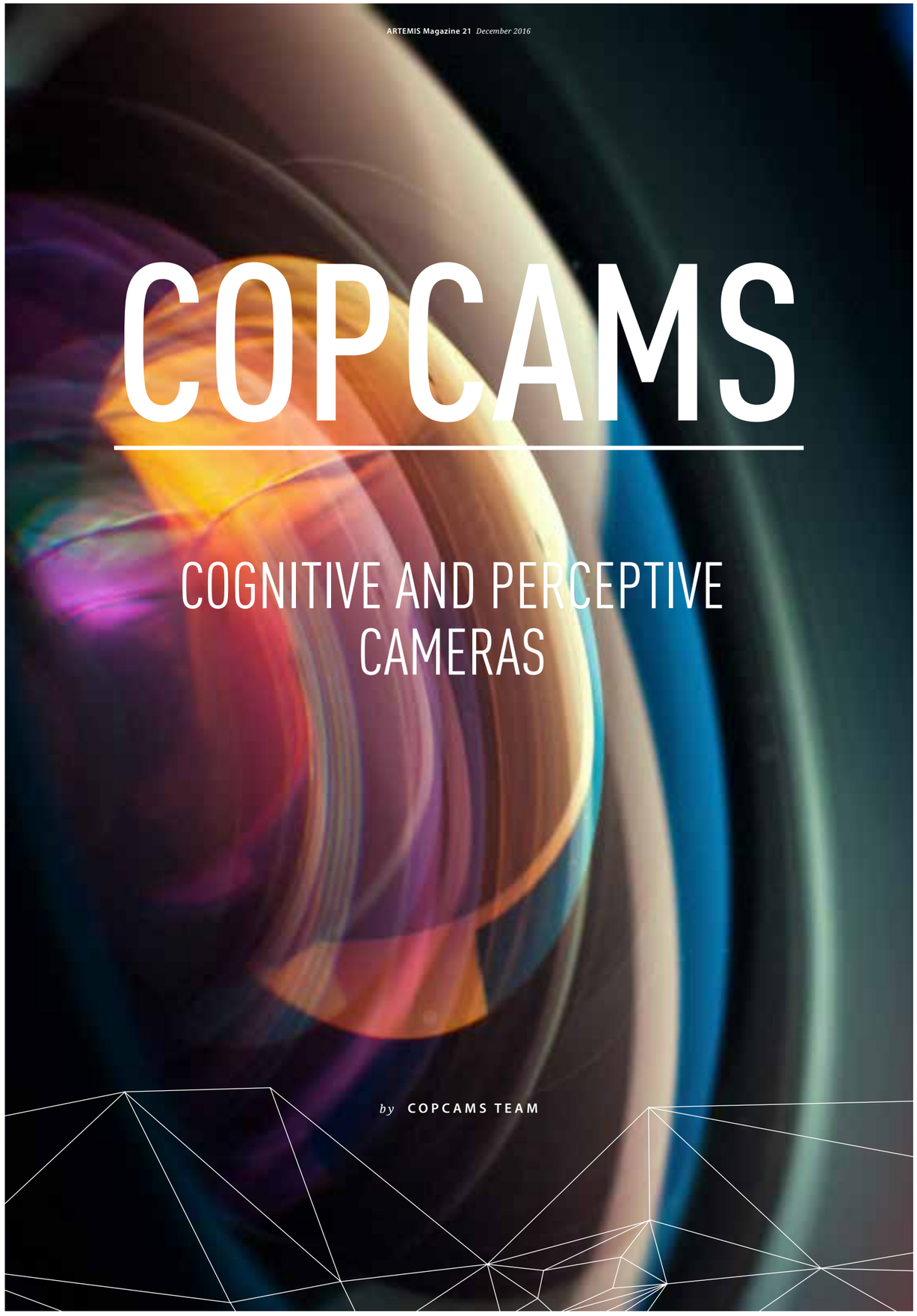
KEYNOTE SPEAKERS

With a focus on Cyber-Physical Systems, the "Embedded Intelligent ICT 1 Systems", Werner Steinhoegl provided insight into the EC Strategy for Digitising European Industry. The information contained a clear overview of programmes related to Cyber-Physical Systems in Europe. As part of these programmes, Bert de Colvenaer continued with an explanation of ECSEL and its Calls for Proposals, to provide a basis to prepare for the upcoming ECSEL 2017 Calls. In addition to the Call information, Prof. Dr. Dieter Rombach of Fraunhofer gave a very strong keynote with clear examples of Digitisation as a driver for new business models that change industry. Throughout his inspiring talk it became very clear that Industry 4.0 is much more than just automation; we actually need to invent new business models and services that adapt and optimise benefits for the final customers.

PREPARATION FOR THE NEXT CALLS

In line with several open H2020-ICT 2016 Calls and with a focus on other future H2020 Calls, this year's H2020 Pre-Brokerage was set up to provide an opportunity to prepare for the upcoming CPS relevant Calls, such as H2020 ICT, IoT and ECSEL Calls. Prior to the conference, project proposers used the ARTEMIS Project Idea Tool (PIT) to create awareness for their project idea and to search for partners. Furthermore, pitches and posters were presented to enhance conversations. To optimise networking moments, the ATC 2016 provided two evening programmes to enjoy in a relaxed and inspiring atmosphere. The networking reception, in summer-time ambiance, was the perfect setting to connect with many different future project partners. In-depth conversations continued the next day in a setting of an authentic Spanish inn established in 1642 in Madrid city centre.

With the valuable feedback from the event questionnaire, we will certainly optimise the next edition of the ARTEMIS Technology Conference. Until then!



COPCAMS

COGNITIVE AND PERCEPTIVE CAMERAS

by COPCAMS TEAM

ARTEMIS Magazine 21 *December 2016*

Vision systems analysing images from multiple cameras are becoming the norm, be it in large-scale surveillance, advanced manufacturing or traffic monitoring. COPCAMS leverages recent advances in embedded computing platforms to develop large-scale, integrated Cognitive & Perceptive Video Systems (CPVS). It aims at exploiting new programmable accelerators, like manycores, and also embedded Graphical Processing Units (GPUs), General Purpose computing on GPUs (GPGPUs), Digital Signal Processors (DSPs) and Field-Programmable Gate Arrays (FPGAs), to power a new generation of greener, low-power, smart cameras and gateways.

A PARADIGM CHANGE FUELLED BY EMBEDDED COMPUTING ADVANCES

COPCAMS contributed to a paradigm change: whereas the previous generation of systems had simple cameras connected to powerful centralised computing servers through high-bandwidth networking, the COPCAMS vision pushed a low-power, high-performance computing system on the edge of the system and in the distributed aggregators. These "smart cameras" and "smart aggregators" process video streams, extract meaningful semantic information and either decide locally whether or not the streams' contents are of interest and are worth propagating, annotate compressed video stream with meta-information computed on higher resolution raw video streams, or use information from other sensors – e.g. acoustic sensors, RFID sensors – to drive the camera towards actual action. Additionally, decentralised, distributed analyses or decision-making can save both energy and bandwidth while generating opportunities for new distributed applications.

MORE FLEXIBILITY FOR SMARTER APPLICATIONS

Due to both algorithmic and computational complexity, previous embedded vision systems were conceived as special-purpose devices dedicated to narrow application domains. The COPCAMS solution represents a significant step towards wider adoption of distributed, flexible embedded vision systems in surveillance of environments and advanced manufacturing.

ADVANCING THE STATE OF THE ART DUE TO A SOFTWARE ECOSYSTEM OF TOOLS AND STANDARD LIBRARIES FOR SMART CAMERAS ON EMBEDDED PLATFORMS

COPCAMS proposes development tools and flexible programming models for embedded GPU programming techniques and code production for image and video analysis, codecs and multi-sensors analysis. Parallelisation tools, data-flow programming languages, directed optimisations, system and scalar modelling have been tested and tried on several aspects of the cognitive video software stack: pre-processing steps to improve the quality and usefulness of still images; image and video understanding, object classification and recognition; highly-parallel video coding schemes; sophisticated data fusion; detection, and multi-camera tracking with object re-identification. On all these fronts, COPCAMS advances the state of the art for embedded perception & vision algorithms in two main ways: adaptation of these techniques to embedded, low-power computing platforms and the use of open source libraries like OpenCL and OpenMP to enable efficient design and cost reduction.

This kick-started a mixed hardware and software ecosystem that reduces costs and development cycles based on low power consumption, high-computing power solutions based on the latest advances in micro-electronics and computing architectures, such as embedded ARM architectures, manycores, GPUs and GPGPUs.

SMART CAMERA BRINGS AN OVERHAUL OF THE VALUE CHAIN

COPCAMS' impact covered the complete range of the value chain: academia and SMEs have advanced embedded platforms to test and optimise innovative vision applications, coding and cognitive algorithms. Platform providers have a growing ecosystem and will have the possibility to explore new market opportunities. System integrators will benefit from the powerful components and tools being developed in COPCAMS and will be able to offer a new generation of vision-related products. Finally, service providers can capitalise on the COPCAMS developments to provide value-added services to end users, way beyond what can be offered today.

PROTOTYPES AND ACTUAL COPCAMS DEPLOYMENTS

COPCAMS prototyped and field-tested full, large-scale vision systems. It exploited advanced platforms, like GPU/GPGPU-based embedded architectures, to power a new generation of vision related devices, able to extract relevant information from captured

images and autonomously react to the sensed environment by interacting at large scale in a distributed manner.

COPCAMS has a significant impact on all addressed applications: product quality control was field-tested in a large-scale production of the copper-graphite commutators, and included three machine-vision based tasks: (1) dimensional measurements of copper base, (2) quality inspection of copper-graphite soldering, and (3) measurement of the mounting holes' roughness. Design of the quality control procedures consisted of three stages: (1) image processing using machine vision algorithms, (2) construction of predictive models using machine learning algorithms, and (3) parameter tuning using optimisation algorithms. These procedures were installed on the embedded computer vision platform and deployed on the targeted commutator production line that operates 24/7 and produces about 15,000 pieces per day.

The resulting automated quality control replaced the previous manual product inspection and enabled innovative on-line, non-contact measurements.

In addition, the manufacturing process can be monitored in real-time via smart cameras with RF (radio frequency) sensing capabilities. This system provides information about the position of assets used in the production process (trolleys, trays, tools, etc.), hence the process can easily be optimised to assure maximum possible productivity within a factory site. Moreover, due to the COPCAMS approach, one can easily and inexpensively scale up the installation by simply installing new smart cameras in areas where tracking is needed, while keeping the energy and bandwidth consumption levels low.

SUMMARY OF IMPACT

COPCAMS facilitates the transition from the highly vertically structured embedded vision systems market toward a more horizontal market, thereby creating new opportunities to be addressed more easily by SMEs and start-ups. Previous lack of flexibility was due to both algorithmic and computational complexity, as embedded vision systems are conceived as special-purpose devices dedicated to narrow application domains. The COPCAMS solution represents a significant step towards wider adoption of distributed, flexible embedded vision systems. COPCAMS provides key enabling technologies to build smart environments, with initial applications for surveillance of environments and advanced manufacturing.

On dissemination, COPCAMS implemented an ambitious strategy that resulted in five patents, three public events and exhibition fair awards, and more than a hundred publications, including eight invited public presentations.

More COPCAMS documentation can be retrieved online at: http://copcams.eu.

ECSEL-JU REACHED THIRD BIRTHDAY

by **YVES GIGASE**

ECSEL Joint Undertaking is in its third year of existence and closed its third Calls. Building on the renowned ENIAC and ARTEMIS Joint Undertakings and the EPoSS platform, ECSEL has integrated the Public-Private-Partnership-model of the two Joint Undertakings with the Horizon 2020 programme. It has done this to the satisfaction of its stakeholders: the 24 ECSEL Participating States, the participants to the projects regrouped in the three Industrial Associations (AENEAS, ARTEMIS IA and EPoSS) and last but not least the European Commission.

After 2,5 years of existence, ECSEL funded 25 projects for a total of 1.2B€ in total costs (*). With the selected projects for 2016, those figures will climb to a total of 38 projects for 2.0B€ in cost. The nearly 700 participants are funded from the European Union budget for an amount of nearly 300M€ and a slightly lower amount of national funding (260M€). With the 2016 Calls this will increase to close to 1200 participants sharing 450M€ of EU funding and 410M€ of national funding. This comes on top of the ENIAC-ARTEMIS portfolio of 118 projects with 2700 participants for a cost of 4.0B€ of which 630M€ was funded by the EU budget and nearly 910M€ of national funding.

But ECSEL is more. ECSEL covers the whole realm from electronic components to Cyber-Physical Systems including integrated Smart Systems. The two presented projects MANTIS and SWARMs are good examples of the kind of projects ECSEL funds.

MANTIS (Cyber-Physical System based Proactive Collaborative Maintenance) is a large project with around 30M€ in cost and 54 participants, that focusses on the important maintenance problematic for large and complex systems. It builds on some of the successful Innovation Pilot Projects of ARTEMIS (Arrowhead, DEWI and EMC2). Several industrial demonstrators are foreseen that amongst other will support the standardization effort in this field.

SWARMS (Smart and Networking UnderWAter Robots in Cooperation Meshes) is a medium-sized project with around 17M€ in cost and 37 participants, and aims to develop a system for cooperating industrial robots. It builds on some of the successful Projects of ARTEMIS (R5COP, DEWI and EMC2). Several prototypes will be demonstrated operating under difficult conditions.

As ECSEL Office we are proud to support this very active community. We encourage any interested reader with questions to contact us, we would love to hear more from you. Enjoy reading about SWARMS and MANTIS!

MANTIS PROJECT

by **URKO ZURUTUZA**

Maintenance strategy (maturity) is typically categorised as: (1) Corrective/Reactive, (2) Preventive, (3) Predictive, and (4) Proactive. The introduction of **corrective maintenance** is very easy and there are no high demands for IT or measuring availability etc., so the investment costs are low. On the other hand, the availability of production equipment, the efficiency of production and the quality of production are lower than is the case with more sophisticated maintenance strategies. In fact, maintenance costs can be reduced through the introduction of a preventive, predictive or proactive maintenance strategy. When introducing **preventive maintenance**, the idea is that maintenance is carried out prior to failures that may abruptly stop the production. In practice, this means time/calendar based maintenance. Even though preventive maintenance is, in many cases, an improvement to corrective maintenance, it is not an ideal approach as it can easily lead to over-maintenance, i.e. equipment is also repaired that actually does not need maintenance. The worst scenario here is that in some cases, maintenance may be the cause of failures, so a machine that would otherwise work correctly might stop due to maintenance. In predictive maintenance condition monitoring is used to support the decision making, i.e. some methods are used to define whether the machine needs maintenance and what the optimal time would be to do this. In principle, when following the predictive maintenance strategy, maintenance is carried out for a high number of components at the same time to minimise the number of production machinery stoppages. When using a preventive maintenance strategy, the necessary spare parts can be reserved and the maintenance personnel can be made available for the tasks. In a **proactive maintenance** strategy, the aim is to reduce the need for maintenance in the first place. In order to do this, it is necessary to be able to understand what is causing the machinery wear and how this can be avoided.

MANTIS' proactive service maintenance platform and its associated architecture draw inspiration from the Cyber-Physical Systems approach. Physical systems (e.g. industrial machines, vehicles, renewable energy assets) and the environment they operate in are monitored continuously by a broad and diverse range of intelligent sensors, resulting in massive amounts of data that characterise the usage history, operational condition, location, movement and other physical properties of those systems.

Sophisticated distributed sensing and decision-making functions are performed in a collaborative way at different levels ranging from (i) local nodes that pre-process raw sensor data and extract relevant information before transmitting it, thereby reducing bandwidth requirements of communication, (ii) over-intermediate nodes that offer asset-specific analytics to locally optimise performance and maintenance, (iii) to cloud-based platforms that integrate information from ERP, CRM and CMMS systems and execute distributed processing and analytics algorithms for global decision-making.

The overall concept of MANTIS is to provide a proactive maintenance service platform architecture that allows future performance to be estimated, imminent failures to be predicted and prevented, and proactive maintenance to be scheduled. The proactive maintenance service platform consists of distributed processing chains that efficiently transform raw data into knowledge while minimising the need for transfer bandwidth. Thus, this chain includes key technologies such as:

+ smart sensors, actuators and Cyber-Physical Systems capable of local pre-processing,
+ robust communication systems for harsh environments,
+ distributed machine learning for data validation and decision-making,
+ cloud-based processing, analytics and data availability,
+ HMI to provide the right information to the right people at the right time in the right format.

MANTIS approaches the development and integration of these technologies in a bottom-up-bottom approach. Technology providers and research partners request use case owners to indicate how they would like the technology to be applied in their systems, and after analysing these requirements, the consortium builds a generalised approach, identifying commonalities. This result can then be personalised to needs that are specific to each use case.

For example, the consortium is now working on algorithm taxonomies or catalogues that support the different predictive and machine-learning functions (Root Cause Analysis, Remaining Useful Life, Maintenance Optimisation, …). Thus, after analysing the algorithms proposed for each use case, and according to the type of data and context needed to process, MANTIS adopters will find a whole catalogue of possible algorithms that can match their needs.

The MANTIS Reference Architecture will be public by February 2018. By then, industrial partners will validate the technologies, but some of them will also adapt their business plans to exploit maintenance services. Partners that use MANTIS in their own facilities want cost reduction and quality improvement. Partners that produce assets that are used by their customers have an increased opportunity to develop maintenance strategies as part of their core business.

SWARMS PROJECT

A PROMISING FUTURE BASED ON THE FIRST SET OF EARLY TRIALS MISSIONS

by **JOSÉ-FERNÁN MARTÍNEZ-ORTEGA**

ARTEMIS Magazine 21 *December 2016*

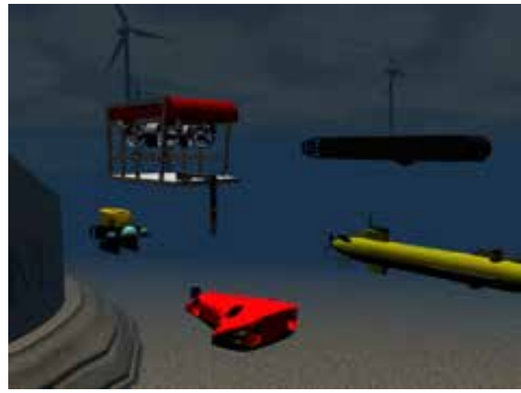
Nowadays, divers are used in underwater activities in a significant number of offshore operations. Since their number is limited, and they are deployed in hazardous environments, overdependence on their work represents an issue for maritime industry. The use of unmanned underwater vehicles could solve this problem, but since they are usually tailor-made for specific tasks and difficult to operate, this solution becomes very expensive. Besides, the complexity of the missions to be carried out might be too high for a single vehicle to complete by itself or even with some assistance.

The aim of the **SWARMs** (Smart and Networking UnderWAter Robots in Cooperation Meshes) project is to expand the use of Autonomous Underwater Vehicles (AUVs), Autonomous Surface Vehicles (ASVs) and Remotely Operated underwater Vehicles (ROVs), to ease the creation, planning and execution of operations by having those vehicles cooperate with each other in an intelligent way, thereby making autonomous operations a viable option for new and existing industries. Not only will this reduce the operational cost of maritime missions, but it will also contribute to solving the current challenges that threaten the expansion of the offshore sector.

To achieve these goals, the approach that has been taken, implies designing and developing an integrated platform for a new generation of autonomous underwater operations as a set of software and hardware components adopted and integrated into the current generation of underwater vehicles. This will enable execution of both simple and complex industrial operations by using cooperating heterogeneous vehicles. Autonomy, cooperation, robustness, cost-effectiveness and reliability of the operations will be improved depending on the sophistication of the activities to be carried out in a mission.

Furthermore, the SWARMs project aims to make AUVs, ASVs and ROVs useful to more users by enabling these vehicles to work in a cooperative mesh, thus opening up new applications and ensuring re-usability, as heterogeneous vehicles can seamlessly combine their own capabilities.

In SWARMs, large companies collaborate with SMEs specialised in the subsea, robotics and communication sectors, as well as with universities and research institutions, to ensure that the newest innovations in subsea robotics will arrive fast to the marketplace. SWARMs involves creating an intelligent framework where cooperation among different areas of knowledge, such as acoustic and radio communications, autonomous underwater and surface vehicles, middleware solutions or context awareness, will improve the deployment of unmanned vehicles for offshore missions.



The results obtained within the Early Trials missions, performed at one of the partner facilities located in Gran Canaria (Spain) during September 2016, have established a high standard regarding environment and infrastructures for tests. Assessing the test results has been very valuable with regard to the planning and implementation work for subsequent stages towards the final demonstrator. The fruitful collaboration among partners participating in the trials produced a high quality set of results aligned with the objectives defined for this milestone (testing the technological developments or devices developed so far).

A set of seven missions was defined in order to provide a comprehensive framework to test the progress within the different tasks in the project. At the Early Trials, each mission produced promising feedback, such as the sensing results obtained by the AUV ECA-A9 and DESISTEK's ROV SAGA, which provided enough data to be analysed. Some missions were focused on communications testing, including tests to validate not only the underwater communication solutions but also long (RF) and short-medium range (AirMax and Wi-Fi) overwater communication. In addition to the off-shore activities, compatibility demonstrations for two different DDS middleware solutions (OpenSplice DDS and CoreDX) used within the SWARMs project, as well as tests involving the prototype of an intuitive input device, were carried out in the laboratory environment, also with satisfactory results. Finally, a demonstration on how an operator will work using the Mission Management Tool all the way from choosing a plausible set of AUVs/ROVs to make high-level plans to solve highly complex problems was performed, including several areas to be scanned and locations for inspection.

As stated, the SWARMs approach will reduce operational costs, increase the safety of tasks assigned to divers and contribute to dealing with the current factors that jeopardise the expansion of the maritime sector. A key goal of SWARMs is to use and exploit the outcome of the project as much as possible. Therefore, the partners will identify opportunities and steps towards the definition of an appropriate exploitation plan, taking into consideration the target stakeholders and addressing the eventual challenges in the exploitation process of the project outcome. For validation purposes, two end-users are also part of the consortium, who will provide useful recommendations at the testing stage in the upcoming demonstrators: Black Sea (Romania) and Trondheim (Norway).

www.swarms.eu

AIOTI: CREATING A DYNAMIC EUROPEAN IOT ECOSYSTEM

Interview with Kees van der Klauw

by **CHRIS HORGAN**

AIOTI was launched on 26 March 2015 at the NetFutures 2015 Conference, in the presence of Commissioner Günther H. Oettinger. AIOTI, or 'the Alliance for Internet of Things Innovation', aims to strengthen the dialogue and interaction among Internet of Things (IoT) players in Europe, and to contribute to the creation of a dynamic European IoT ecosystem and accelerate the uptake of IoT.

Other objectives include fostering experimentation, replication and deployment of IoT, and supporting the convergence and interoperability of IoT standards, as well as gathering evidence on market obstacles for IoT deployment, and mapping and bridging IoT innovation activities worldwide, in the EU and its member states. The members of the alliance include key IoT industrial players – large companies, successful SMEs and dynamic start-ups – as well as well-known European research centres, universities, associations and public bodies. Most of the AIOTI activities are carried out through Working Groups, which focus on well-defined horizontal areas of development, in research and innovation, policy issues and proposed standards as well as vertical, cross-disciplinary activities focused on relevant application areas in the field. In October 2015, the Alliance published 12 reports covering IoT policy and standards issues. AIOTI provided detailed recommendations for future collaborations in the Internet of Things Focus Area of the 2016-2017 Horizon 2020 programme.

KEY MILESTONE

Kees van der Klauw, Senior Vice President of Philips Lighting Research and Chairman of AIOTI, remarks that "after several months of hard work, our Alliance for Internet of Things Innovation reached a major milestone on 22 September this year, when we received the confirmation from the Belgian authorities that AIOTI could establish an Association under Belgian Law. This means that we can now act as a formal representative for our

stakeholders, as well as establish financial management, create cooperation agreements and much more. This transformation is essential, not only to secure AIOTI's future, but also to enable us to have more impact. We are now able to take the next steps in building a European Technology Platform (ETP) relationship with the European Commission."

STIMULATING BUSINESS AND INNOVATION

You are chairman of this initiative. How did you become involved? "Right from the start there was a 'click' among the 30-40 companies or so invited to the meeting in Brussels, who felt that the Internet of Things needed to get a boost, a new impetus. Philips was one of those companies and so I was there as a representative. Philips is a real champion of open innovation – something that is very evident in one of the world's largest innovation hubs, the High Tech Campus Eindhoven, which is home to more than 200 companies and embodies the Philips mindset of collaborative co-creation and open innovation. I also had this 'click' with the topic of IoT and volunteered to chair Working Group 2 on innovation ecosystems. I must say that all the Working Groups *(see AIOTI Working Groups chart below)* did their jobs very well, since the European Commission has adopted their recommendations and these can be seen in various criteria in Horizon 2020. But as the European Commission gradually moved out of the leading role to a supporting role, it was down to someone from our alliance to step up to the plate … and that was me. I saw the need to take the next step and I came up with a few proposals. And that is how I became, more or less, the chair of the chairs. It had not been my plan to become the chairman, but I guess my enthusiasm got me voted into the job by the others. I do not regret it, because I am really engaged in the topic and am keen to spend time on it – it does take up a tremendous amount of time and energy – but it is important for European innovation, for industry. It does require a different mind-set. Perhaps the fact that I am not the traditional lobbyist in Brussels is the reason why I fit the bill. My goal is to stimulate business and innovation, rather than simply looking for square-metre optimisation. Of course, we have had to spend a number of months getting all the statutes and by-laws in place. Quite a job, considering that there were 22 founding members, not the usual 2 or 3. But now we are there in the legal and

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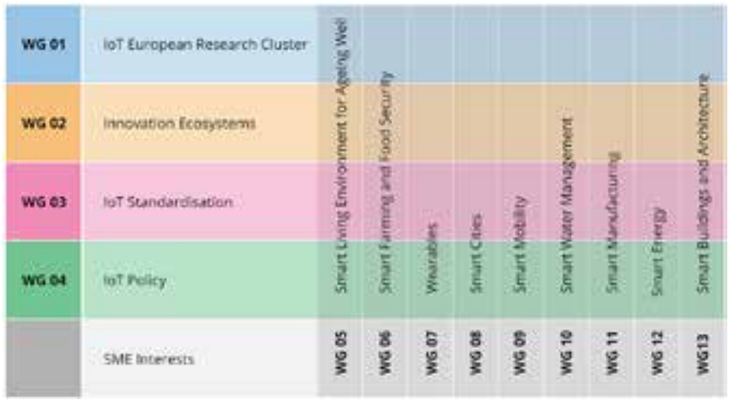
organisational sense; we can start focusing on content and giving our members the kind of support they want and need."

identifies and, where appropriate, makes recommendations to address existing IoT standards, analyses gaps in standardisation, and develops strategies and use cases aiming for (1) consolidation of architectural frameworks and reference architectures in the IoT space, (2) (semantic) interoperability and (3) personal data & personal data protection for the various categories of stakeholders in the IoT space. This last subject is also closely aligned with Policy Working Group 4. "What I like about Working Group 3 is that it is not the intention to invent new standards, but to stimulate the adoption and convergence of standards. Industry drives standardisation, so what we can do is to stimulate common use of standards and interfaces. What is vital in the IoT world is that multiple parties will be able to interoperate – whether that is smart cities or smart farming. If everyone is sitting on proprietary standards without open interfaces, then it is not going to work. What open interfaces means is not that everyone can do everything without restriction, but that doors can be opened and the participants can move through them with data and information. By the way, I think we should clear up the confusion that exists about what 'open' means. It does not mean that anyone can switch the light on or off in a smart city. Open is about the possibility of exchanging information, to build new use cases across verticals. To create value for citizens in smart cities, for instance, information across all the verticals (energy, lighting, traffic management, etc.) must be shared through standard interoperable interfaces."

AIOTI Working Groups chart



ONE MAN, ONE VOTE

Do you expect the number of members to grow, now that the foundations have been well and truly established? "Firstly, the 500 members that joined without any obligation will have to consider converting their membership – after all, they will now have to pay a membership fee. But in order to keep the threshold as low as possible for start-ups and SMEs, we decided to make the membership fee just 750 euros, irrespective of company size. No differentiation, therefore. The one man, one vote concept. We regard every member as equal in this ecosystem, so we believe that equal rules should apply … equally. Of course, the founding members chipped in with more in order to provide the start capital, but they have not acquired any extra rights for this, only eternal fame," Kees smiles.

IOT STANDARDISATION

One of the goals of the association is to contribute to the convergence and interoperability of IoT standards. How will AIOTI approach this aim? "One of the most active Working Groups is Working Group 3 on IoT Standardisation." This Working Group

Goals and members' interests

"In the future I expect us to become an ETP, European Technology Platform. We are already participating in European roundtables, so we are quite well recognised on the European stage. We generate European roadmaps and have innovation ecosystems. We are matchmaking, bringing companies, stakeholders and end-user representatives together. This end-user representation is something I would like to see more of. Adoption by the public is extremely important. We are very keen to give our members as much support as possible. Via matchmaking, as I already said, via lectures or other media, or provide information on legal aspects or how to join or write a proposal, for example. We currently have a chair dedicated to SMEs and start-ups – how to help them, how to engage them. I think it is also in the interests of large companies to engage these SMEs. You need the large verticals like Philips and Siemens to develop the major platforms, but the value of such platforms is increasingly coming from use cases that are defined in partnership with SMEs and start-ups. So there is a common interest here in bringing big and small together. We also want to enable our members to gain easy access to international innovation ecosystems – whether these are in Europe or Japan – and to support scalability by having game rules that are standard throughout Europe and possibly beyond. Our focus is Europe, first and foremost, but we are not naïve in thinking that the Internet of Things is bound by borders. So we will link up outside Europe. But as a European initiative, membership is for those companies and organisations that have ties within Europe. It is not the intention, by the way, for AIOTI to do what other platforms, like ARTEMIS-IA, are doing – our goal is to fill in the gaps. To focus much more on innovation from an application rather than a technology perspective, since future applications will be created less and less from behind a research desk and more and more through experimentation in co-creation with users in the field, in the living labs we see around us today."

BATON BLUES

with Ronald Begeer

In this edition, Ronald Begeer, Programme Manager Research at Royal Philips Electronics, picks up the baton and takes us on his lap of ARTEMIS-IA. Ronald has been part of the community for a number of years, which is hardly surprising given the commitment of Philips to research with campuses in Eindhoven, Cambridge in the UK and Cambridge, Massachusetts, in the US. Philips is one of the founding fathers of ARTEMIS-IA. "Within ARTEMIS-IA, I am part of the Strategic Research Agenda working group, specifically for the healthcare input, a role I also undertake with the ECSEL-JU. Essentially, my involvement with ARTEMIS-IA stems from the involvement of Philips in all kinds of research programmes and projects, with my personal contributions being in the healthcare field."

How do you see the ARTEMIS-IA view of cooperation and co-creation? "Well, I think that there is quite a similar approach we take at Philips. We are all faced with the same kinds of challenges. Take the CRYSTAL project, for example. It was cross-domain, but the engineering challenges were the same for different industries involved. So we all cooperated and this led to co-created solutions that can be applied for a wide range of applications in different domains. Not only will innovations be accelerated, but products and services will also get to market faster. That is a challenge and a goal that we all share. ARTEMIS-IA is the perfect kind of network to do this level of cooperation and co-creation."

To what extent are funded projects essential to the development of innovation, particularly within Philips? "You just have to look at the CRYSTAL project. We have been able to incorporate many of the developments there into our own way of working. It means we did not have to do this on our own – the same goes for all the other members of the consortium, by the way – and we got the results faster. The funding certainly enabled the cooperation to become established and allowed us all to focus on our own innovations without having to spend time and money on developing the essential engineering knowledge. These funded projects are good for us, since they allow us to become involved in technology programmes yet still focus on the aspects that are key to us. The two programmes, ARTEMIS-IA and ITEA, complement each other. Due to specific national requirements, I can say that we focus more on the technology innovation in ARTEMIS-IA and on the product innovation in ITEA. The emergence of the ECSEL-JU is a welcome development for us, because it means we can combine our efforts – embedded systems and chips are bedfellows, as it were, so we also participated in ENIAC projects. We get the best of both worlds. I also think it is an opportunity for both organisations to combine nano-electronics and embedded systems. A good example is the Philips catheter development project that incorporates both the technological and intelligent processing development to produce a new product."

And what kind of business impact do these projects have? "If you look at the projects we execute at Philips, I think you can differentiate three kinds of research: exploratory, knowledge and business-oriented. Sometimes the outcome is a prototype and sometime it is a new function for an existing product. The timeline is different for each type of project, but every project has one thing in common: there is always pressure to bring the results faster and closer to the market. Ten years ago, a throughput time of three to five years would have been acceptable, but nowadays that is already regarded as pretty long-term."

You mentioned CRYSTAL earlier – one of the objectives of CRYSTAL was to accelerate time to market by doing more with the same amount of effort. "Indeed. The impact on our business of a model-driven engineering toolchain is significant, because we are now actually implementing the CRYSTAL results directly in our business development processes. If there had been no CRYSTAL, we would still probably have found the kind of results we were looking to achieve, but now we have been able to do it faster, more extensively and with much less effort and money. Ultimately, we can put more effort in innovating new products and services."

Digitisation is a hot topic these days. On the European agenda and on the ARTEMIS-IA agenda. To what extent can ARTEMIS-IA help drive digitisation? "The digitisation drive is very clearly expressed in the Strategic Research Agenda and there is a need to develop digital platforms that not only create products, but also contain services and an ecosystem. An analogy might be the digital camera. Fifty years ago it was a box with a lens. Then it became a mechanical box with digital content and a lens. Now it is just one of the functions of your phone or tablet, around which new types of business are created. Digital photobooks, image processing, social media photo-sales … I believe the same will happen in automotive, with connected cars and data transmission, security issues and all kinds of new potential business models. Healthcare, too. Just look at all the data that is collected from hospitals and from patients as well as from wearables and the like – if you can combine all this, then personalised treatment and prevention become much more of a feasible proposition. Not just for patients but also for healthy people. Prevention rather than cure. These are tremendous challenges: digitisation and personalisation of the healthcare system. Both technical and societal. Once again, I believe that ARTEMIS-IA is an excellent network to promote the power of digitisation. "

And what is the engine that powers you? "I am motivated by being able to improve the lives of people all over the world. And I am passionate about technology. I love working in an innovative environment where people are always looking for new opportunities and new applications."

Who would you like to hand over the baton to and do you have any particular question to this person? "Yes, I would like to hand it over to Cornel Klein of Siemens. I am interested to find out what his vision is on the impact of digitisation in general and especially in the automotive world of connected cars."

Your musical choice? "I am a member of a choir that sings oratorios. And recently I sang in a concert in which we performed Vivaldi's Gloria in Excelsis Deo and Mozart's Requiem. So the cooperation between the orchestra and choir I think would be very representative for the cooperation we have in our ARTEMIS-IA programmes."

CALENDAR

HIPEAC 2017 CONFERENCE

23-25 January 2017
STOCKHOLM, SWEDEN

The HiPEAC conference is the premier European forum for experts in computer architecture, programming models, compilers and operating systems for embedded and general-purpose systems.

ARTEMIS BROKERAGE 2017

31 Jan- 01 Feb 2017
BRUSSELS, BELGIUM

In 2017, ECSEL Joint Undertaking will open its fourth Call. ARTEMIS Industry Association organises the ARTEMIS Brokerage Event 2017 in Brussels to help with the drafting of project proposals and finding the right consortium partners.

IOT INTERNATIONAL CONFERENCE

7 – 8 March 2017
BRUSSELS, BELGIUM

The inaugural IoT International conference 2017 will provide an in-depth understanding of IoT device-level design requirements, system on chip (SoC) needs, protocols, networks, security and sensor development.

EMBEDDED WORLD

14-16 March 2017
NUREMBERG, GERMANY

Embedded World is the leading international fair for embedded systems. Discover the innovations from the embedded sector, meet experts and acquire new customers: Around 900 exhibitors and 1,600 speakers from 42 countries will be presenting the entire spectrum; ranging from construction elements through modules and full systems, operating systems, hard- and software to services - to more than 30,000 trade visitors.

DATE 2017

27-31 March 2017
LAUSANNE, SWITZERLAND

In 2017, the DATE conference will celebrate its 20th edition! Hence, the event will have an exciting and profound conference programme, focusing on areas bringing new challenges to the system design community.

DIGITAL INNOVATION FORUM 2017

10-11 May 2017
AMSTERDAM, THE NETHERLANDS

The Digital Innovation Forum (DIF) is a new international bi-annual event, co-organised by ARTEMIS-IA and ITEA, and is the industry-driven Digital innovation conference in Europe, showing R&I results and emerging challenges towards a vision on the future for and built by industry.

EDITORIAL INFORMATION

Online version is available at www.artemis-ia.eu

Publisher:
ARTEMIS Industry Association
High Tech Campus 69-3
5656 AG Eindhoven, The Netherlands

Design and Creative lay-out:
Studio Kraft – Veldhoven, the Netherlands

Text & copy:
CPLS – Goirle, the Netherlands

Printed by:
Drukkerij Snep - Eindhoven, the Netherlands

Photography:
With thanks to ARTEMIS involved persons for any assistance and material provided in the production of this issue.

With thanks to the interviewees, project participants, ARTEMIS Industry Association office, the ARTEMIS-IA Presidium and other ARTEMIS-IA-involved persons for any assistance and material provided in the production of this issue of the ARTEMIS Magazine.

Submissions:
The ARTEMIS-IA office is interested in receiving news or events linked to the aim of ARTEMIS-IA, related projects or in general: R&D in the field of Embedded and Cyber-Physical Systems area.
Please submit your information to info@artemis-ia.eu

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