The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter

Issue 6 - February 2022

NEWS FROM UCAMCO

UcamX and Integr8tor v2021.12

Ucamco is proud to release UcamX v2021.12 and Integr8tor v2021.12. These new versions of our CAM and Pre-CAM software include dozens of additions, new options, fixes and general improvements to increase our customers' productivity.

Catch up on what's new in the summaries below and click the links to find out more.

UcamX v2021.12

- YELO Copper Adjuster extensions
- YELO Legend Adjuster extensions
- YELO Mask Adjuster extensions
- DXF Input extensions
- Rout Manager optimizations
- Transform Object extensions
- Inkjet Output, new option
- ODB++ Output extensions

Full UcamX release overview

Integr8tor v2021.12

- Outline handling extensions
- QED report extensions
- Cockpit extensions
- DRC capabilities in UcamX WE extensions
- Net compare refinements
- ODB++ Output extensions
- Automatic layer stack-up enhancements
- Security and performance upgrades

Full Integr8tor release overview

UcamX and Integr8tor v2021.12 are now available for download for all maintenance contract users. Customers who wish to upgrade to this version outside of a maintenance contract or wish to take out a maintenance contract, are welcome to contact their local sales channel or send an email with their request for quotation to presales@ucamco.com.

The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter

Issue 6– February 2022

NEWS FROM AUSTRIA

AT&S Provides High-Tech Components for New Leica M 11

For more than a century, the name Leica has stood for lenses and cameras with the highest quality, first-class workmanship “Made in Germany” and ease of use. Whether photography beginners, ambitious amateur, or professional photographers – they all gladly rely on the high-quality high-tech products from the Leitz Park in Wetzlar (Germany), the corporate headquarters of Leica Camera AG.

With the new Leica M11, the company is once again setting a milestone, combining the unique experience of traditional rangefinder photography with state-of-the-art camera technology. At the heart of the new M generation in the iconic Leica, design is a full-frame BSI CMOS sensor with triple resolution technology: raw files in DNG format or JPEGs can be created with a resolution of either 60, 36, or 18 megapixels. Thus, the M11 offers even more flexibility and allows shooting in outstanding image quality.

This is where AT&S, as a development partner of innovative PCB and interconnection technologies, comes into play. A total of twelve different AT&S circuit boards are included in the new M11, including the solutions for integrating the image sensor and image processing. “*The trust that a premium manufacturer like Leica places in AT&S products and solutions once again confirms our company’s solution expertise and technological capabilities*,” says AT&S CEO Andreas Gerstenmayer.

The printed circuit boards are manufactured both at the Hinterberg site and at the AT&S plant in Korea. The use of special AT&S technologies that allow very compact and flexible electronic interconnection solutions makes it possible for Leica to build digital cameras that offer maximum performance in the smallest possible space while consuming very little energy.

The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter
Issue 6– Febuary 2022

NEWS FROM SERBIA

Danutek TECH-DAY 2022 - Serbia
3rd March 2022

Naučno-tehnološki park Niš / Science and Technology Park Nis

Seica will attend the Danutek TECH-DAY 2022, the first-of-a-kind event in Serbia in the electronic industry!

In 2021 SEICA started a partnership with Danutek as its representative throughout Slovenja, Serbia and Croatia. Danutek is a leading distributor and service provider in the SMT Manufacturing Industry who offers complete solutions in the field of Electronic, Manufacturing and Inspection equipment.

SEICA test solutions enrich their product range and SEICA's experience in the field of testing combined with the competence of Danutek's specialized engineering team, represent a great opportunity for local manufacturers of the Electronics industry.

Seica will showcase the Pilot V8 Next, the complete solution for those who want elevate performance like high test speed, low to medium volumes, test coverage and flexibility, for prototyping, manufacturing, or repairing any type of board.

Its vertical architecture is the optimum solution for probing both sides of the UUT simultaneously. The PILOT V8 Next is equipped with 8 electrical flying test probes (4 on each side), 2 Openfix flying probes (1 on each side), 4 Flying Pods (2 front, 2 rear) and 2 CCD cameras (1 on each side), 2 Thermal Scan sensors, 2 Laser sensors, 2 LED Sensors, for a total of 20 mobile resources available to test the UUT. Available in the Manual and Automatic version.

For Danutek, the goal with this conference is to bring the latest breakthroughs and technologies in the industry closer to their customers, in NT Park Nis. Visitors will have the opportunity to learn about new features, have hands-on equipment experience, and discuss processes with experts.

Seica is proud to take part to this technological day with the Danutek Team.

Seica is where customers look for leading-edge solutions… 10.03.2022, Naučno-tehnološki park Niš / Science and Technology Park Nis,
Book your spot now: https://lnkd.in/eH89gc6g

The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter
Issue 6– February 2022

ELECTRONIC INDUSTRY NEWS

Moore's Not Enough: 4 New Laws of Computing

Moore's and Metcalfe's conjectures are taught in classrooms every day—these four deserve consideration, too

ADENEKAN DEDEKE

ISTOCK PHOTO

MOORE'S LAW METCALFE'S LAW COMPUTING

I teach technology and information-systems courses at North-eastern University, in Boston. The two most popular laws that we teach there—and, one presumes, in most other academic departments that offer these subjects—are Moore's Law and Metcalfe's Law. Moore's Law, as everyone by now knows, predicts that the number of transistors on a chip will double every two years. One of the practical values of Intel cofounder Gordon Moore's legendary law is that it enables managers and professionals to determine how long they should keep their computers. It also helps software developers to anticipate, broadly speaking, how much bigger their software releases should be.

Metcalfe's Law is similar to Moore's Law in that it also enables one to predict the direction of growth for a phenomenon. Based on the observations and analysis of Robert Metcalfe, co-inventor of the Ethernet and pioneering innovator in the early days of the Internet, he postulated that the value of a network would grow proportionately to the number of its users squared. A limitation of this law is that a network's value is difficult to quantify. Furthermore, it is unclear that the growth rate of every network value changes quadratically at the power of two. Nevertheless, this law as well as Moore's Law remain a centrepiece in both the IT industry and academic computer-science research. Both provide tremendous power to explain and predict behaviours of some seemingly incomprehensible systems and phenomena in the sometimes inscrutable information-technology world.
King Camp Gillette reduced the price of the razors, and the demand for razor blades increased. The history of IT contains numerous examples of this phenomenon, too.
I contend, moreover, that there are still other regularities in the field of computing that could also be formulated in a fashion similar to that of Moore's and Metcalfe's relationships. I would like to propose four such laws.

Law 1. Yule's Law of Complementarity

I named this law after George Udny Yule (1912), who was the statistician who proposed the seminal equation for explaining the relationship between two attributes.

I formulate this law as follows:
If two attributes or products are complements, the value/demand of one of the complements will be inversely related to the price of the other complement.

In other words, if the price of one complement is reduced, the demand for the other will increase. There are a few historical examples of this law. One of the famous ones is the marketing of razor blades. The legendary King Camp Gillette gained market domination by applying this rule. He reduced the price of the razors, and the demand for razor blades increased. The history of IT contains numerous examples of this phenomenon, too.

The case of Atari 2600 is one notable example. Atari video games consisted of the console system hardware and the read-only memory cartridges that contained a game's software. When the product was released, Atari Inc. marketed three products, namely the Atari Video Computer System (VCS) hardware and the two games that it had created, the arcade shooter game Jet Fighter and Tank, a heavy-artillery combat title involving, not surprisingly, tanks.
Crucially, Atari engineers decided that they would use a microchip for the VCS instead of a custom chip. They also made sure that any programmer hoping to create a new game for the VCS would be able to access and use all the inner workings of the system's hardware. And that was exactly what happened. In other words, the designers reduced the barriers and the cost necessary for other players to develop VCS game cartridges. More than 200 such games have since been developed for the

VCS—helping to spawn the sprawling US $170 billion global video game industry today.
A similar law of complementarity exists with computer printers. The more affordable the price of a printer is kept, the higher the demand for that printer's ink cartridges. Managing complementary components well was also crucial to Apple's winning the MP3 player wars of the early 2000s, with its now-iconic iPod.
From a strategic point of view, technology firms ultimately need to know which complementary element of their product to sell at a low price—and which complement to sell at a higher price. And, as the economist Bharat Anand points out in his celebrated 2016 book The Content Trap, proprietary complements tend to be more profitable than non-proprietary ones.

Law 2. Hoff's Law of Scalability

This law is named after Marcian Edward (Ted) Hoff Jr.—the engineer who convinced the CEO of Intel to apply the law of scalability to the design and development of processors. Certainly, the phenomenon of scalability was well known in the automobile industry before it made a significant impact on the computing industry. Henry Ford was a notable example of the application of this scalability law. Henry Ford's company was perhaps the first company to apply this law on a grand scale. Ford produced the Model T, which was the first mass-produced car. At the core of Henry Ford's achievement was the design of an automobile that was made for mass production. Ford's engineers broke down the assembly process of the Model T into 84 discrete steps. The company standardized all the tasks and assigned each worker to do just one task, thus standardizing the work each worker performed as well. Ford further built machines that could stamp out parts automatically. Together with Ford's innovative development of the first moving assembly line, this production system cut the time to build a car from 12 hours to about 1.5 hours. The Model T is probably the paradigmatic example of how standardization enables designing processes for scalability.

Until the early 1960s, each IBM system had its own distinct operating system, processor, peripherals, and application software. After the purchase of a new IBM computer, customers had to rewrite all their existing code.
Intel also mastered the law of scalability early in its history. In 1969, Busicom, a Japanese company, approached Intel about building custom chips for use in its programmable computers. Gordon Moore was not interested in a custom chip because he knew that it would not be scalable. It was the quest to create a scalable product that led Intel's Ted Hoff to partition the chip into a general-purpose logic processor chip and a separate read-only memory (ROM) chip that stored an application program. As Albert Yu shows in his history of Intel, Creating the Digital Future, the fledgling semiconductor company's general-purpose processor, the 4004, was scalable and pretty much bequeathed the world the hardware architecture of the modern computer. And it was Hoff who redesigned the 4004 to scale. Hoff's Law of Scalability could thus be described as follows:

The potential for scalability of a technology product is inversely proportional to its degree of customization and directly proportional to its degree of standardization.
In sum, the law predicts that a technology component or process that has a high degree of customization and/or a lower degree of standardization will be a poor candidate for scaling.

Law 3. Evans's Law of Modularity

This law derives its name from Bob Overton Evans. He was the engineer who in the early 1960s persuaded IBM's chairman, Thomas J. Watson Jr., to discontinue IBM's technology design approach, which had produced a hodgepodge of incompatible computers. Evans advocated that IBM should instead embark on the development of a family of modular computers that would share peripheries, instructions, and common interfaces. IBM's first product family under this new design rubric was called System/360.

Prior to this era, IBM and other mainframe computer manufacturers produced systems that were unique. Each system had its own distinct operating system, processor, peripherals, and application software. After the purchase of a new IBM computer, customers had to rewrite all their existing code. Evans convinced CEO Watson that a line of computers should be designed to share many of the same instructions and interfaces.

If a paper is copied four times, one can now share the resource with five people. But digitize the document and the value-creation opportunities are multiplicative rather than additive.

This new approach of modular design meant that IBM's engineers developed a common architecture (the specification of which functions and modules will be part of the system), common interfaces (a description of how the modules will interact, fit together, connect, and communicate), and common standards (a definition of shared rules and methods that would be used to achieve common functions and tasks). This bold move on Big Blue's part created a new family of computers that revolutionized the computer industry. Customers could now protect their investments because the instructions, software, and peripheries were reusable and compatible within each computer family.

Evans's Law could be formulated as follows:
The inflexibilities, incompatibilities, and rigidities of complex and/or monolithically structured technologies could be simplified by the modularization of the technology structures (and processes).

This law predicts that the application of modularization will reduce incompatibilities and complexities.

One further example of Evans's Law can be seen in the software development industry, as it has shifted from the "waterfall" to the agile software development methodology. The former is a linear and sequential model stipulating that each project phase can begin only the previous phase has ended. (The name comes from the fact that water flows in only one direction down a waterfall.) By contrast, the agile development approach applies the law of modularization to software design and the software development process. Agile software developments tend to be more flexible, more responsive, and faster.

In other words, modularization of software projects and the development process makes such endeavours more efficient. As outlined in a helpful 2016 Harvard Business Review article, the preconditions for an agile methodology are as follows: The problem to be solved is complex; the solutions are initially unknown, with product requirements evolving; the work can be modularized; and close collaboration with end users is feasible.

Law 4. The Law of Digitiplication

The concept of digitiplication is derived from two concepts: digitalization and multiplication. The law stems from my own study and observations of what happens when a resource is digitized or a process is digitalized.

The law of digitiplication stipulates that whenever a resource or process is digitalized, its potential value grows in a multiplicative manner.

For example, if a paper is copied four times, one can now share the resource with five people. But digitize the document and the value-creation opportunities are multiplicative rather than additive.

Consider the example of a retail store. The store's sales reps, tasked with selling physical products to individual people, are able to service only one customer at a time. However, if the same retail environment is placed online, many customers can view the store's products and services. Digital text can also easily be transformed into an audio format, providing a different kind of value to customers. Search functionality within the store's inventory of course adds another layer of value to the customer. The store's managers can also monitor how many customers are viewing the store's website's pages and for how long. All of these enhancements to the customer's (and retailer's) experience provide different kinds of value. As can be seen by these examples, the digitalization of a resource, asset, or process creates multiplicative rather than additive value.

As a further example, Amazon founder Jeff Bezos first began digitizing data about books as a way to facilitate more and greater book sales online. Bezos quickly transformed Amazon into a digitiplication engine by becoming a data-centric e-commerce company. The company now benefits from the multiplicative effects of digitalized processes and digitized information. Amazon's search, selection, and purchase functions also allow the company to record and produce data that can be leveraged to predict what the customer wants to buy—and thus select which products it should show to customers. The digitization of customer feedback, seller ratings, and seller feedback creates its own dimension of multiplicative value.

Conclusion

These four laws can be useful for engineers and designers to pose questions as they begin to develop a product. For example: Do customer requirements lend themselves to a product design that could be scaled (or mass-produced)? Might the functional requirements they're working with be satisfied through the development of a modular product design? Could Yule's Law of Complementarity provide cues toward mass production or modular design alternatives? Could product complements be developed in-house or outsourced? Software engineers might also be led toward productive questions about how data could be digitized, or how specific processes could be digitalized to leverage the law of digitiplication.

The fields of IT and electrical engineering and computer science (EECS) have become critical disciplines of the digital age. To pass along the most succinct and relevant formulations of accumulated knowledge to date to the next generation, it's incumbent on academics and thought leaders in these essential technical fields to translate lessons learned into more formalized sets of theorems and laws. Such formulations would, I hope, enable current and future generations of IT and EECS professionals to develop the most useful, relevant, impactful, and indeed sometimes even disruptive technologies. I hope that the proposed four laws in this article could help to trigger a larger discussion about the need for and relevance of new laws for our disciplines.

Adenekan Dedekeis an Executive Professor of Supply Chain and Information Management at North-eastern University, Boston. His work has been published in IEEE Software, Computer, IEEE Security & Privacy, and other academic journals.

Significant Advance at the JET Fusion Reactor

By Maurizio Di Paolo Emilio

A European consortium of fusion power researchers has tripled the output of the Joint European Torus (JET) fusion reactor, a significant improvement and an encouraging step as private and public organizations around the world race to build a fusion reactor that outputs more energy than is put in.

The record output was also JET's last great leap. Hailed as a "crucial test bed" for fusion research for decades, the JET reactor design was pushed to its limits with this most recent experiment. If practical fusion generators can be made, they will have to be based on newer reactor designs.

Researchers from the EUROfusion consortium, a massive scientific partnership including 5,000 professionals from throughout Europe and financed by the European Commission, said they have produced 59 megajoules of energy at the Joint European Torus (Jet) facility in Oxford, UK. The previous record, achieved in the same reactor in 1997, was an energy output of 21.7 megajoules.

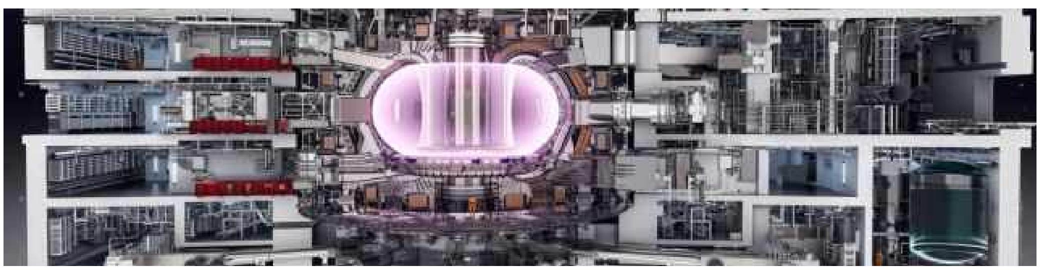
JET is owned by the UK Atomic Energy Authority, while its scientific operations are controlled by EUROfusion, a European partnership. future fusion power reactors that, similar to JET, will employ deuterium-tritium fuel mix and operate under comparable conditions.

Scientists are struggling to reach a historic milestone in their pursuit for a reliable, endless supply now more than ever.

Generators that burn fossil fuels are gradually being phased out. So-called renewables, such as solar, wind and wave energy, are gradually being phased in. Nuclear power plants are being repositioned as "sustainable," and compared to fossil fuel plants nuclear does have advantages, but nuclear power relies on fission (splitting rather than fusing atoms) and produces wastes that typically remain radioactive for thousands of years.

Fusion is cleaner, produces very little waste, and, if it can be made practical, would require comparatively little fuel. As a result, it is regarded as the holy grail of energy. It isn't a viable option at the moment, but many believe it should be possible between now and 2050, as the world shifts away from fossil fuels as a source of climate change.

The latest news from JET is yet another in a recent string of encouraging reports about about advances in fusion research, which, if nothing else, demonstrate that patience, investment, and hard work can produce such leaps — perhaps patience and investment foremost, given that JET's previous record was established 25 years ago.


Jet's structure (Source: https://www.euro-fusion.org/devices/jet/)

The JET Fusion Energy Project
Nuclear fusion involves the containment of a plasma, a super-heated and electrically charged gas composed of positive ions and electrons that move freely in it. Plasma is difficult to produce and control and is subject to several types of instability.

JET was founded in 1978 and has been in business since 1983. It is based in Abingdon, Oxfordshire, United Kingdom. The approach to fusion taken by the JET experiment is to contain plasmas with magnetic confinement in a tokamak-type reactor capable of fusing deuterium and tritium (two hydrogen isotopes), to achieve a plasma temperature of 150 million degrees Celsius, ten times that of the Sun's core. Its primary goal is to obtain and study plasma under conditions and dimensions which are close to those of a thermonuclear reactor. Since the closure of the U.S.

TFTR tokamak in the spring of 1997, JET has been the only experiment in the world capable of operating with the deuterium-tritium (D-T) fuel mixture usable in possible future fusion power plants.

Seawater contains deuterium and tritium. According to scientists, 0.5 tons of deuterium, which could be collected from seawater at a rate of roughly 3,000 tons per day, would be required to power the UK's total current electrical consumption for one day.

During a five-second time span (the full duration of the recent fusion experiment), JET was able to create 59 megajoules of energy, equating to around 11 megawatts of electricity.

However, many technical challenges remain. In Europe, these challenges are being addressed by the Eurofusion consortium, which includes about 5,000 science and engineering experts from across the EU, Switzerland, and Ukraine.

The experiment did not produce a great quantity of energy, but it confirmed the consortium can keep heading in the direction it planned to go. The ultimate objective is for JET's operations to be absorbed into the ITER initiative, which is situated in southern France and involves numerous countries. ITER's stated plan is to have a practical fusion reactor operating at capacity by 2035. JET's results suggest that a fusion reactor project using the same technology and fuel mixture (which is the case with ITER) could be able to achieve this goal.

JET can advance no further because its copper electromagnets get too hot. Internally cooled superconducting magnets will be employed for ITER.

Global power demand is expected to double by 2040 and could increase five-fold by 2060 as electrification expands to new applications. Even if on separate research routes, the world's objective is to build the first fusion power plant capable of supplying grid-scale electricity with zero emissions of climate-altering gases. It is projected to succeed in one or two decades, with some variation on the final date, which is a rather short period when we remember that the earliest scientific investigations into fusion date back to the 1930s and the Tokamak solution was born in the 1950s.

-

Maurizio Di Paolo Emilio

Maurizio Di Paolo Emilio has a Ph.D. in Physics and is a Telecommunications Engineer. He has worked on various international projects in the field of gravitational waves research designing a thermal compensation system, x-ray microbeams, and space technologies for communications and motor control. Since 2007, he has collaborated with several Italian and English blogs and magazines as a technical writer, specializing in electronics and technology. From 2015 to 2018, he was the editor-in-chief of Firmware and Elettronica Open Source. Maurizio enjoys writing and telling stories about Power Electronics, Wide Bandgap Semiconductors, Automotive, IoT, Digital, Energy, and Quantum. Maurizio is currently editor-in-chief of Power Electronics News and EEWeb, and European Correspondent of EE Times. He is the host of PowerUP, a podcast about power electronics. He has contributed to a number of technical and scientific articles as well as a couple of Springer books on energy harvesting and data acquisition and control systems.

Issue 6 – February 2022

NEWS FROM THE IPC

IPC Welcomes the European Chips Act

Says action must be paired with rebuilding the broader European electronics manufacturing ecosystem

The electronics manufacturing industry is welcoming the release of the European Commission's European Chips Act with its strong support for advanced packaging and calling for its swift implementation as part of a broader and equally important strategy to rebuild the European electronics manufacturing ecosystem.

In its proposal, the Commission proposes robust public and private investment in chip fabrication as well as semiconductor packaging. Today, in a post-Moore's Law environment, electronic interconnection within the package is key to realizing more advanced functionality and economic efficiencies in chip designs. Pairing investments in advanced packaging with investments in chip fabrication is necessary to technological innovation and greater supply chain resiliency.

"The Chips Act is critically important in ensuring a sustainable supply of cutting-edge chips for Europe's electronics manufacturers and strategic industries," said IPC President and CEO John Mitchell. "However, chips don't function in isolation; they require interconnection with other components via printed circuit boards and PCB assemblies, which are mostly built outside of Europe. To meet the goals of the Chips Act, Europe needs to take a comprehensive approach to bolstering the region's electronics manufacturing ecosystem."

IPC has been a leading European voice for a "silicon-to-systems" approach that recognizes the strategic importance of printed circuit board (PCB) fabricators and electronics manufacturing services (EMS) companies. Last April, IPC released a detailed analysis of Europe's strengths and vulnerabilities in these critically important sectors as well as policy recommendations to boost the resilience and competitiveness of the industry in Europe.

Electronic systems are essential to every industrial sector across Europe's economy and key to delivering on Europe's digital and green transitions. And yet, the Chips Act perpetuates a far too narrow, triage-like approach to technological innovation focused almost singularly on one segment of the electronics manufacturing ecosystem to the exclusion of the ecosystem upon which it depends. A viable, long-term strategy for innovation and economic growth requries a strong foundation of European electronics manufacturing which largely remains marginalized in the region's industrial policies.

Alison James, IPC's Senior Director for European Government Relations notes, "The European electronics value chain has strategic gaps and vulnerabilities which include, but are not limited to, semiconductors. Now more than ever, it is vital that chip investments are made within the framework of a broader strategy designed to strengthen the region's electronics industry through all its constituent parts."

IPC has been making the case to European policymakers that there is a real opportunity now for the EU to deliver on the full potential of the Chips Act by also fostering needed investments in the crucial supply chain including R&D, Packaging, specific equipment, new PCB and EMS facilities and a skilled and educated workforce across the chain. A holistic approach to the sector is needed to ensure future innovation, resiliency, and security.

IPC looks forward to working with the European Institutions and Member State Governments to implement the Chips Act and to augment it with much needed support for the related industries upon which semiconductor manufacturers rely. IPC calls attention to building Europe's capacities throughout the electronics value chain, the importance of technological sovereignty without losing sight of working closely with strategic partners to obtain the required resiliency in *all* supply chains dependent on electronics.

The European Institute for the PCB Community

EIPC SPEeDNEWS

Issue 06- February 2022

International Diary

2022

15th EIPC Technical Snapshot Webinar
Extended version Morning & Afternoon session
Registrations via www.eipc.org
23 February

16th EIPC Technical Snapshot Webinar
Registrations via www.eipc.org
23 March

17th EIPC Technical Snapshot Webinar
Registrations via www.eipc.org
April

EIPC @ HKPCA
7-9 April
Shenzhen

EIPC @ SMT Connect
10-12 May
Nuremberg, Germany

18th EIPC Technical Snapshot Webinar
Registrations via www.eipc.org
May

EIPC @ CPCA
18-20 May
Shanghai, China

EIPC Summer Conference
Visit Ericsson 5G centre
14 & 15 June
Örebro, Sweden

19th EIPC Technical Snapshot Webinar
Registrations via www.eipc.org
September

KPCA Korea
21-23 September
Korea

EIPC @ FED Conference
29-30 September
Bamberg, Germany

20th EIPC Technical Snapshot Webinar
Registrations via www.eipc.org
October

TPCA Taiwan
26-28 October
Taiwan

EIPC @ Electronica
15-18 November
Munich, Germany