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CIMdata News

Aerospace & Defense PLM Action Group Publishes Position Paper on Model-Based Systems Engineering (MBSE)

24 January 2019

Representatives from eleven major aerospace and defense companies have released the position of the Aerospace & Defense PLM Action Group (AD PAG) on the topic of enabling a model-based systems engineering (MBSE) conceptual design process for collaboration between original equipment manufacturers (OEMs) and their suppliers. The group’s goal is MBSE collaboration and the bi-directional exchange of integrated digital models representing the system architecture, behavior, and design requirements.

This position paper details the problem statement for aerospace and defense OEMs operating within a large, globally distributed supply chain of design and development partners. Design collaboration is seriously hindered by relying on traditional, document-based development processes. The paper reports the outcome of a research study performed by a cross-industry team of MBSE subject matter experts to identify and characterize the gap in the capability of current MBSE standards and SysML-based authoring tools to support data exchange out-of-the-box. The paper then presents an evaluation of solution alternatives that defines both short- and long-term options to address the shortfall in current SysML-based authoring tools.

Mark Williams, Project Lead for MBSE Process and Tools at Boeing, who was a member of the project team stated, “To realistically reduce the cost of developing new products we must evolve from our document-based paradigm and embrace the principles of model-based engineering. This begins with the implementation of MBSE. We, therefore, need to define the near-term opportunities that enable the exchange of digital design information between the OEMs and the supply base. This is an industry problem that isn’t easily answered by relying on existing standards. Specifically, the aerospace industry needs to collectively define requirements for what needs to be exchanged, understand its own priorities, scour the market for alternatives, and agree on an interim set of solutions.”

Since its founding in 2014, the Aerospace and Defense PLM Action Group, which is administered by CIMdata, has sponsored research and jointly staffed projects on a diverse set of prioritized industry and technology topics, including Model-Based Definition; Multiple View Bill of Materials; PLM Technology Obsolescence Management; Global Collaboration; and MBSE. As an outcome of these

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investments, the Group has released a series of direction statements and position papers that are freely available for downloading from its website at www.ad-pag.com. Making these materials available is consistent with the Group's mission to engage proactively within the PLM ecosystem and advocate for common direction and positions within the aerospace and defense industry on PLM-related topics of importance to the members.

For more information, please contact CIMdata at info@cimdata.com.

About CIMdata

CIMdata, a leading independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. Since its founding in 1983, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM enabling technologies.

CIMdata works with both industrial organizations and suppliers of technologies and services seeking competitive advantage in the global economy. In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certificate programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia-Pacific. To learn more about CIMdata's services, visit our website at www.CIMdata.com, follow us on Twitter: <http://twitter.com/CIMdataPLMNews>, or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 (734) 668-9922. Fax: +1 (734) 668-1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495 533 666.

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ANSYS Acquires Granta Design (CIMdata Highlight)

25 January 2019

ANSYS announced their intent to acquire Granta Design, a Cambridge UK-based firm globally known for their materials science knowledge and expertise. Privately held, Granta is estimated to have global annual revenues of approximately \$20 million. No terms of the transaction were announced and it is expected to be completed by the end of Q1 of 2019. ANSYS will provide more details about the transaction and its potential impacts on their financial outlook after the acquisition closes.

While some people may use the expression "they wrote the book" on a topic, in Granta's case that is literally true, with their founder Mr. Mike Ashby author or co-author of the leading textbooks on materials. Granta Design was spun out of Cambridge University in 1994 and today they claim to be the "largest company and R&D organization operating in the materials information technology market." In a way, Granta has created a nexus for materials knowledge, bringing together materials information from a myriad of global technical sources, and organizing that knowledge for use by others both in industry and academia. Along the way they have become a key alliance partner for a range of product lifecycle management (PLM) solution and service providers. This is a great move for ANSYS, as material knowledge is an underpinning of simulation and analysis, made even more important by advances in materials design and new manufacturing techniques like additive manufacturing. One question that will

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be answered over time is how well Granta will be able to maintain its existing business relationships across the PLM Economy while serving ANSYS' needs. Given ANSYS' ability to navigate these co-opetition waters the outlook is positive. Congratulations to the ANSYS and Granta Design teams for this bold move.

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Can Your Enterprise Architecture Support Digital Transformation? (CIMdata Commentary)

24 January 2019

Key takeaways:

- *Non-linear growth in product complexity and global competition are driving the need for digital transformation.*
- *Surviving and thriving in today's world require a modern enterprise architecture that creates a digital thread that properly manages digital twin configurations across the full lifecycle so effective decisions can be made.*
- *Compromises in legacy or monolithic architectures inhibit fast, accurate impact and traceability analysis, two critical decision processes in today's fast paced innovation-driven business world.*
- *The Aras PLM Platform provides a strong foundation for digital transformation initiatives and is currently deployed at leading industrial companies such as General Motors, Airbus, and Microsoft.*

Customers, suppliers, competitors, regulators, and the drive to globalization are applying ever increasing pressure for better products at lower prices. At CIMdata we hear about this increasing pressure from our industrial clients daily, and also hear how solution providers are helping industrial companies transform their businesses to counter the pressures, survive, and even thrive. Faster implementation of product and business process innovations are well understood as a solution to these issues.

Successful product and business process innovations are the result of making good decisions. Decisions range along a continuum from making simple choices to long-term, high impact, strategic choices. We all make decisions every day without data and information. This is fine for clear-cut or low impact decisions, but as the consequences of decisions get more complex, the risk of adverse impact from poor

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decisions grows. It's harder for the human mind let alone an organization of any size to understand all the relationships between inputs and outputs, which leads to sub-optimal decisions and errors. When errors happen, then you have to react and make another decision, without necessarily understanding what caused the initial error. This trial and error approach is expensive and time consuming. When decisions are scaled up and cross functions, disciplines, and organizational boundaries, it's a wonder anything works in this world.

Fortunately, advances in technology have enabled much of the information that describes the world as we know it to be converted to digital data, organized, and structured. This conversion underlies today's hot topic, "Digital Transformation," which is commonly defined as "the process by which a company evolves its organization, processes, supporting systems, and business model from analog to digital." Digital transformation, a CIMdata focus since its inception, is orders of magnitude more complex than converting paper documents to electronic files, and manual processes to electronic workflows. When used appropriately, digital information helps decision makers gain the insights they need to be confident that they are making correct, effective decisions.

Digital Twin and Digital Thread the Keys to Digital Transformation

CIMdata defines the digital twin as "a physics-based description of the system resulting from the generation, management, and application of data, models, and information from authoritative sources across the system's lifecycle." The most important digital asset a company owns is its product definition. A fully formed digital twin is a configuration of all the data needed to produce and support a product throughout its life. When products are purchased by customers, they are paying for the real, physical twin of the product, however IoT is enabling new features and services that add incremental value to product users and product providers via the digital twin.

The digital thread refers to the communication framework that allows a connected data flow and integrated view of an asset's data (i.e., its Digital Twin) throughout its lifecycle across traditionally siloed functional perspectives. Leverage of the digital thread enables a digital twin configuration to be driven or exercised with simulation inputs to verify the configuration will perform as planned before it is produced. The digital thread also is driven by field data to virtually replicate issues helping to identify problems after production. These two scenarios are the basis of two critical processes within product producing enterprises: impact analysis and traceability.

Few, if any companies have fully implemented a digital twin strategy for their products, because it is a difficult problem. While the digital transformation term is new, it has been happening for decades, and is now hitting critical mass in which huge positive business impacts are very close or even starting to be realized. Technology evolution and improvement, standards, market pressures, and general knowledge are now at a point where the decades old vision of digital product definition, including digital twins, is within reach.

The Burden of Legacy Technology

To effectively support a decision making process, data must be organized and managed, so it is clear, concise, valid, and usable, a task much easier said than done. Historically, data about the product has been stored in many silos across multiple functional areas, including downstream areas not managed by product development. Information from areas such as manufacturing, supply chain, and service are especially critical to define and support as-manufactured and as-maintained configurations of the digital twin. The Internet of Things (IoT) and Industry 4.0 initiatives are new sources of data that risk becoming instant legacy systems unless the data generated is properly organized, integrated, and managed.

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Most of today's large enterprise software solutions have been around for several decades and are commonly organized into functional silos. Typically, they started out focusing on a single function and added capabilities to grow into adjacent functional areas. Enterprise Resource Planning (ERP) started out ordering and managing material for the factory floor and grew into managing the manufacturing BOM, as well as the finance function including sales and receivables (i.e., the Order-to-Cash process). The majority of today's PLM solutions started out as product data management (PDM) for documents and CAD files. Over time, these solutions grew into managing configurations of product data from requirements through product and process design and engineering.

Enterprise software suites such as ERP and PLM are commonly created by acquiring products and technology. The merger and acquisition strategy potentially allows the company to address a new market opportunity more quickly. However it does have downside issues. The result is often stitched together solutions each with its own architecture, which causes limitations in what the solution can be configured to do. Customers often don't understand these limitations until after they start their implementation.

Reengineering efforts to consolidate onto a single software architecture are difficult as customers don't want to migrate off what is working, until all the capabilities exist in the reengineered product. Reengineering also requires significant investment and slows new capability development often to the dissatisfaction of existing customers. Furthermore, once the acquisition is complete, the acquiring company does not have as strong an incentive to consolidate the products as the revenue and customers have been captured.

Legacy architectures not designed to support end-to-end business processes struggle to support today's business requirements such as traceability and impact analysis. These business processes are required to span across silo boundaries and the product lifecycle forcing customization and other workarounds. The solution to these problems is to implement a new enterprise architecture, a product innovation platform.

Modern Architecture Requirements

Information Technology (IT) has evolved in many ways to be a utility service. Historically, IT was focused on technologies such as hardware, operating systems, networking, and lower level infrastructure. As those areas have matured, IT has been able to focus more on solving business issues. The underlying infrastructure can't be ignored, but it is no longer all consuming. By leveraging a platform strategy, IT is able to focus on solving business issues. Ultimately, ensuring that data and processes are able to support current and future business requirements.

Solutions are available today that can support the ultimate vision of an end-to-end view of the business, as well as the product lifecycle including the critical processes of traceability and impact analysis. There are two primary strategies for legacy solution providers: continuous improvement and discontinuous innovation. Each has benefits and drawbacks. Continuous improvement is usually less disruptive to customers but adding breakthrough functionality is more difficult because legacy data and capabilities must be supported. Discontinuous innovation will usually provide advanced capabilities faster, usually at the expense of useful legacy functionality. Furthermore, discontinuous innovation usually requires users to deal with a new implementation rather than an upgrade.

Replacing a PLM solution is usually a large complex project that few companies take on without significant deliberation. A key aspect of any major change is ensuring it will last, i.e., it is future proof. For a PLM solution to be future proof it needs to support on premise, cloud, and hybrid infrastructures, as well as current and emerging applicable standards. Since no single solution will likely be able to

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support all these requirements, a wide range of connectivity options must be available from custom direct integrations for legacy solutions to modern Service Oriented Architecture (SOA) connections like Simple Object Access Protocol (SOAP) and Representational State Transfer (REST). And last, but far from least, security must be inherent throughout the solution, and flexible enough adapt as security technology and processes evolve.

Aras PLM Platform

In 2018, CIMdata added Aras to our Mindshare Leaders list. While smaller than their competitors, Aras has seen considerable success over the last few years as shown by well-known companies such as General Motors, Airbus, and Microsoft who have implemented the Aras PLM Platform. The Aras PLM platform is still architecturally clean, that is they have not merged any acquired source code into their product. The service-oriented architecture has been extended to add capabilities, new services add only the capability needed to support requirements without extra or duplicate functionality. For example, the workflow and security services are leveraged by all other services, there is no extra code. Perhaps the most interesting point noted by Aras is that no subscribers have customized Aras web service code even though they have access to do so. This is a testament to the breadth and depth of Aras's services and one of the reasons Aras is able to include upgrades within their standard subscription service agreement.

While CIMdata has published much about Aras over the years, two publications clearly describe why CIMdata considers Aras to be a state-of-the-art product innovation platform. The commentary [Aras PLM Platform: Redefining Customization & Upgrades](#)¹ describes how the Aras PLM Platform can adapt to a wide variety of business needs that span industries and the product lifecycle. Second, the eBook, [Product Innovation Platform Assessment: Aras PLM Platform](#),² assessing the Aras PLM Platform against CIMdata's product innovation platform maturity model.

Conclusion

Digital transformation is a new term that describes improving business through the use of information technology and PLM capabilities, but it is not a new approach. PLM has been focused on this issue for several decades, and it a necessary critical element of any company's digital transformation strategy.

Few if any legacy architectures were designed to support end-to-end processes such as impact analysis and traceability. Most were developed to support silos in functional areas and have had extensions grafted on. While extending legacy solutions can work for a while, this eventually hits a wall and a new architecture is required.

At CIMdata, we believe business is at an inflection point, the evolution of business and customer requirements, as well as technology, are causing data volume and complexity to grow exponentially, and the growth must be addressed to ensure long-term business success. A digital transformation program with management of the product lifecycle data, based on a product innovation platform, at its core is the best path forward to ensure long-term success. The Aras PLM Platform belongs on a short-list for companies assessing their digital transformation requirements.

About CIMdata

¹ <https://www.cimdata.com/en/resources/complimentary-reports-research/commentaries/item/10115-aras-plm-platform-redefining-customization-upgrades-commentary>

² <https://www.cimdata.com/en/resources/complimentary-reports-research/white-papers>

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CIMdata Releases White Paper on Industry 4.0

22 January 2019

CIMdata, Inc., the leading global PLM strategic management consulting and research firm, announces the release of a white paper focused on Industry 4.0, a German-defined initiative that has been taken up in countries around the world.

The Industrie 4.0 initiative started in 2006 as one point in a 10-point high-tech German strategic plan and has consistently promoted the Internet of Things and services since then. Their effort recognized the importance of social platforms, mobile, analytics, cloud, and the Internet of Things (IoT) to the future of manufacturing and global commerce. The core design principles of Industry 4.0 are interoperability, information transparency (including the notion of the digital twin), technical assistance (augmenting humans in analysis and physical work), and decentralized decision making. Some talk about Industry 4.0 as the convergence of information technology (IT) and operation technology (OT), a bridging of digital and physical realms to create cyber-physical production systems enabled by the Industrial Internet of Things (IIoT).

Countries around the world have responded to this vision, building their own programs to advance their societies. This paper offers an overview of the responses in five major global economies in which CIMdata delivers its annual PLM Market & Industry Forum: The United States, Germany, India, China, and Japan. Each country is pursuing the Industry 4.0 vision with a strategy unique to their situation. CIMdata believes that Industry 4.0 and the digitalization trend sweeping business are really two sides of the same coin. Further, manufacturing companies pursuing these strategies need to have strong PLM practices and enabling technologies to profitably serve markets of one. As witnessed in our global PLM market research, this wave can provide a huge opportunity for the PLM Economy.

The CIMdata white paper on Industry 4.0 is available on <https://www.cimdata.com/en/resources/complimentary-reports-research/executive-summaries/item/11303-industry-4-0-a-regional-update>. CIMdata's global PLM Market Research Reports are also available at www.CIMdata.com.

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world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM-enabling technologies.

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CIMdata and SMS_ThinkTank™ Expand Strategic Partnership for Enabling Sustainable Product & Process Innovation through the Effective Application of PLM and Systems Modeling & Simulation

25 January 2019

CIMdata, Inc., the leading global Product Lifecycle Management (PLM) strategic management consulting and research firm and SMS_ThinkTank™, an industry leading firm providing systems modeling and simulation (SMS) expertise to develop and continuously improve engineering best practices for innovative product development, today announced the expansion of their two-year old strategic partnership. This partnership will help manufacturers and PLM/MBSE (Model-Based Systems Engineering) /S&A (Simulation & Analysis) solution providers successfully address the evolving challenges associated with the digital design, development, and lifecycle operations of innovative products, processes, and cyber-physical systems, as well as the associated digital transformation of businesses.

Significant global product development trends are making multi-domain, multi-physics, multi-scale, systems-level virtual prototyping, and performance simulation capabilities an indispensable element in enabling the digital-lead transformation to model-driven product development, especially for complex cyber-physical systems. These major business trends include:

- Digitalization of enterprise business and engineering functions, including product development and manufacturing, as well as in-service operations
- Design-for-sustainability and energy efficiency, green/conservation/re-use—the full circular economy
- Smart systems being driven by the Internet of Things (IoT) and Industry 4.0, including physics-based “digital twins” with “augmented human intelligence” enabled by AI (Artificial Intelligence)/machine learning/deep learning and advanced data analytics
- Mass customization driven by software features that create key market differentiators
- Design-for-purpose materials from the molecular level up and new manufacturing methods (e.g., additive manufacturing/3D printing)

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- Products delivered as services—an on-going innovation and utility business model that require manufacturers to re-think their product design, service, and obsolescence strategies

The complexity of cyber-physical systems across all industries is increasing exponentially due to embedded software and electronics components that account for an ever-increasing amount of the product value and competitive differentiation for industry leading manufacturing companies. For many OEMs and suppliers to remain competitive, innovation is a key differentiator and simulation-driven systems development best practices in organization, process, and technology must be adopted to address the complex performance requirements and user-friendly features requested by customers. Tightly integrating the efforts of CIMdata and the SMS_ThinkTank™ will strengthen each organization's ability to deliver leading industry-specific consulting expertise required to help manufacturers, as well as supporting solution providers, address these rapidly evolving market challenges and achieve the goals of Model-Based Design, Model-Based Systems Engineering, and Digital Transformation initiatives. Specifically, this partnership will help manufacturers and solution providers in defining application user stories, industry best practices and solution requirements to develop comprehensive implementation roadmaps with measurable ROI. These plans must account for the organizational process change and maturity necessary to achieve sustainable innovation via the implementation of state-of-the art model-based engineering approaches in product development, manufacturing, and sustainment.

The SMS_ThinkTank™ partnership activity will primarily interact with and actively support CIMdata's Simulation-Driven System Development (SDSD) Consulting Practice that is headed up by Mr. Donald Tolle. In the expanded partnership, Mr. Tolle will act as the primary business development contact for both organizations and projects will be jointly quoted and staffed, as appropriate for the customer and project scope.

“There is a cross-industry recognition that the advancement of systems modeling, and simulation is paramount to remaining competitive in a world of ever more complex products and processes. Companies need to consider how they can best implement changes in organization, process, and technology rather than focus on tools to solve the major challenges resulting from existing and future market demands. This expanded partnership will help companies to enable a greater level of control over unexpected engineering disruptions that challenge them on a daily basis.” said Edward Ladzinski, CEO and Co-Founder of the SMS_ThinkTank™ LLC.

“We are excited to expand our partnership with the SMS_ThinkTank™. The firm's principals bring deep and broad industry expertise in the application of systems modeling and simulation technologies,” said Peter Bilello, President, CIMdata, Inc. “Our current and future customers will benefit significantly from this consulting services partnership.”

“The engineered systems and society's requirements are producing new levels of complexity that are driven by focusing much more on sustainability of nature and business. Hybridization, electrification, autonomous transportation, connected and interactive physical systems play a central role in our modern environment and thus, challenge businesses worldwide. By expanding our strategic partnership, we will not only provide our customers globally with the leading expertise to master these challenges but also provide a much more focused source for specific content development and deployment in this space,” said Frank Popielas, Managing Partner and Co-Founder of the SMS_ThinkTank™ LLC.

About SMS_ThinkTank™ LLC

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The SMS_ThinkTank™ is an industry leading resource providing systems modeling and simulation expertise to help its clients develop and improve engineering business practices for innovative product development. It promotes a collaborative and vendor-neutral approach based on open digital platforms and industry data standards. To learn more about SMS_ThinkTank visit <http://www.smsthinktank.com>, follow us on Twitter: http://twitter.com/sms_thinktank, LinkedIn: <https://www.linkedin.com/company/sms-thinktank> or call +1 877. 254.5171.

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Getting to Markets of One (CIMdata Blog)

25 January 2019

CIMdata's Vice President, Stan Przybylinski, recently shared his thoughts on advanced variant configuration management capabilities. In this blog post, Stan considers the common goal that is shared by companies pursuing a digitalization or Industry 4.0 strategy, that is: being able to profitably serve markets of one by making their products and processes more configurable.

Learn more by reading the full blog post at: <https://www.cimdata.com/en/resources/cimdata-blog/item/11313-getting-to-markets-of-one>

CIMdata will delve into this topic at the upcoming PLM Market & Industry Forum events which will take place in Ann Arbor MI; Frankfurt Germany; Pune, India; Beijing, China; and Tokyo, Japan this coming April. The theme for 2019 is "Augmented Intelligence: Applications Across the Product Lifecycle".

For more information visit our PLM Market & Industry Forum web pages at <http://www.cimdata.com/en/education/plm-market-industry-forums>

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Validating Autonomous Vehicles through Simulated Driven Miles (CIMdata Commentary)

23 January 2019

Key takeaways:

- *MSC Software brings to Hexagon Manufacturing Intelligence (Hexagon MI) a deep understanding of the challenges faced by the automotive industry in developing safe and reliable autonomous vehicles without physically driving billions of miles.*
- *Hexagon MI offers numerous simulation tools as part of its autonomous road vehicles development platform, VTD, for representing vehicle dynamics, traffic and road scenarios, active safety sensors, and motion-control intelligence.*
- *Hexagon MI's simulation offerings have been widely applied in the development of automated vehicles to: 1) study realistic traffic conflict scenarios; 2) produce reliable vehicle response simulations at different levels of detail; and 3) enable quick design iterations, based on accurate modeling of active safety sensors and practicable control strategies.*

The Validation Challenge of Autonomous Road Vehicles

The proliferation of autonomous road vehicles, enabled mainly by the integration of advanced sensors and real-time artificial intelligence, is expected to help create new mobility experiences and new mobility-related business models, while improving traffic flow and crash-avoidance, as well as reducing environmental pollution and occupant-stress. The biggest hurdle to leveraging these opportunities, however, is the validation of safe operation of autonomous vehicles (AVs) in complex, continuously-changing traffic scenarios that include autonomous, human-driven and parked vehicles, bicycles, pedestrians, traffic signals, and detour postings, in different light and weather conditions.

Over the past decade, AV-prototypes have been tested on public roads to better understand their interaction with the current driving environment. Waymo,³ for example, has covered 8 million miles of AV-driving on public roads since 2009. Additionally, Waymo has also covered 5 billion miles of AV-driving through simulation. This combined strategy of driving AVs on public roads and simulations appears imperative for meeting the predicted need for several billion driven miles to demonstrate the reliability of AVs.⁴ Moreover, with simulated driven miles being a large multiple of the public road driven miles (over 600x in the case of Waymo), hints at the accelerated understanding and validation that could be achieved by relying on the simulated driven miles.

The validation of robust operation of AVs in all possible driving environments and traffic conflict scenarios can be accomplished much more efficiently and cost-effectively through simulation than driving prototype AVs on public roads. Public roads testing of the AV prototypes should be carried out only after simulation-based design iteration cycles have successfully been completed. In other words, simulation-guided design iterations should be used for wide-ranging experimentation with scenarios, maneuvers, and design variables, then public road driving of prototype AVs should be undertaken,

³ Waymo's autonomous cars have driven 8 million miles on public roads, The Verge, June 2018

⁴ Driving to Safety: How Many Miles of Driving Would it Take to Demonstrate Autonomous Vehicle Reliability, RAND Corporation, 2016

mainly for confirmation of actual performance in critical scenarios and maneuvers.

Simulation Needs of AV Development

AVs need active safety sensors such as RADAR; LiDAR; as well as cameras to identify road markers, other vehicles, pedestrians, signals, sign posts, and obstacles; in addition to sensors that monitor the changing dynamic state of the vehicle.

Active safety sensors are the eyes of the AVs whose signals need to be processed and interpreted quickly and reliably for the vehicle to function according to the artificial intelligence built in it. A major aspect of enhanced and robust perception of the driving environment is sensor-fusion, which leverages multiple sensors to overcome the functional restrictions of individual sensors, and to ensure that unreliable performance of individual sensors, due to natural restrictions or faulty outputs, does not cause unintended motion. Finally, the ability to plan motion and make decisions about motion control in a continuously changing environment is a human capability, which needs to be enabled in AVs through artificial intelligence.

Many large and small organizations globally are working aggressively to enable the three capabilities mentioned above in AVs, for different passenger segments. However, the need to substantially accelerate and validate these efforts remains, and the consensus in the AV development world is that simulation is imperative for better and faster learning, redesign, and validation. With the computational power and simulation tools available today, it is feasible to carry out design, verification, and validation of AVs in large part based on simulation. In fact, due to the sheer complexity and unknowns involved, simulation for developing AVs is considered the first essential step that must be taken.

The virtual design, verification, and validation of AVs require the following:

- Active safety sensor models: Realistic, validated mathematical models of sensors such as RADAR, LiDAR, and cameras with accurate representations of the effects of weather and other factors such as material reflectivity, speed, contrast, and granularity, on their performance.
- Vehicle dynamics models: Several levels of vehicle dynamics mathematical models in terms of detail, to enable the use of appropriate levels of refinement for the driving environment and tradeoffs between accuracy and simulation speed.
- Driving environment models: Realistic and computationally efficient representation of the roads, intersections, shoulders, traffic signals, and the dynamic states and potential motion of other road occupants as well as the interaction with the AV being studied.
- Motion planning and control algorithms: Realistic and robust models for planning the motion of the virtual AVs within the simulated driving environment and controlling their motion based on interaction with its virtual elements.

The investigation of billions of simulated driven miles of AVs needs realistic representation of thousands of driving environments with each driving environment having hundreds, if not several thousand traffic scenarios. Combination of the large number of driving environments and traffic scenarios is expected to create the envelopes around potential critical conditions in which the AVs must perform satisfactorily. The unknowns involved in the validation of AVs are so large that all potential critical cases are not likely to be covered, based on simulation alone. However, it would be reasonable to expect that a very large set of critical scenarios and maneuvers would be covered based on numerical experimentation, and a much smaller set of critical cases is likely to surprise us during prototype testing on public roads and test beds.

Hexagon MI's Open Development Platform for Simulating Driven Miles

Over the last two years Hexagon has acquired MSC Software, VIREG GmbH, and AutonomouStuff, which, integrated with its prior expertise in sensors, mapping, and positioning intelligence, has put Hexagon MI in a leading position to help accelerate the validation of AVs through simulation.

Hexagon MI's open Vehicle Test Drive (VTD) platform leverages the simulation and algorithmic elements imperative for AV development such as for vehicle dynamics, sensor-response, driving environment representation and animation, and vehicular traffic scenarios. The platform allows integration of externally developed sensor-fusion algorithms and driving intelligence applications, enabling users to examine the effectiveness of their proprietary solutions. The platform coordinates the interaction between the information generated and used by the different areas mentioned above.

VTD includes reliable mathematical models for predicting the responses of a wide range of active safety sensors such as RADAR, LiDAR, mono and stereo cameras, and ultrasonic sensors including the degradation in their performance due to weather and operating conditions. These models are constantly refined by Hexagon MI based on the knowhow residing in sensor producing divisions including Leica's and NovAtel's LiDAR and Global Navigation Satellite System (GNSS) technology.

The virtual driving environments needed for validating AVs can be created and animated on the VTD platform to realistically represent the interaction between the AVs and the elements of the driving environment. The virtual environment can either be generated inside VTD, or by digitizing roads using Hexagon's Leica Pegasus mapping capability. The changes in the driving environment due to the motion of the AV, included in that virtual environment, are computed. In effect, the driving environment is recreated based on sensor signals and the motion of the surrounding vehicles as well as other occupants to reproduce realistic interactions. The information regarding the motion of the AV, other vehicles, and pedestrians or obstacles could be leveraged by external artificial driving intelligence applications developed by users or third-parties to perform sensor-fusion for object-detection and object-tracking, as well as for motion planning and motion control, to assess the performance of the virtual AVs.

Hexagon MI's simulation offering for representing vehicle dynamics response at different levels of refinement is crucial for quickly carrying out a large number of design iterations. A detailed multibody dynamics model with high-fidelity tire modeling and refined suspension modeling (i.e., an Adams model from MSC Software) is needed to assess the AV response in severe lateral maneuvers for collision avoidance such as lane changes, with potential rollover, uncontrollable oversteering, or serious occupant discomfort risk. Whereas, for simpler scenarios such as hard braking of the AV in a straight-line motion, with very little yaw instability or rollover concern, a lower order lumped parameter model is enough, allowing many more iterations at the level of design variables. Even when yaw instability could become a concern, perhaps without rollover risk, a higher order lumped parameter model could be used without resorting to a full-fledged Adams model.

The VTD open platform, with published and fully documented application programming interfaces (APIs), allows users to include the artificial driver intelligence that they want to investigate into the AV simulation ecosystem. In this way, users can quickly iterate over the changes to the driver intelligence algorithms based on the response of active safety sensors under critical weather and operating conditions. In addition, a separate artificial driver intelligence capability is available as part of Hexagon's AutonomouStuff offering. Consequently, it is possible to directly compare the simulated AV response with the prototype AV physical response by using the same artificial driver intelligence in both cases. This should be very helpful for design validation, because design iterations based on simulations alone, at some point, could be drifting away from the physical reality, and direct comparison at different

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levels of design maturity would help increase confidence in the overall AV response simulations. Essentially, a digital twin of the AV in the driving environment can be developed, based on the vehicle, the driving environment measurements, and the vehicle dynamics simulations connected to the real-time re-creation of the changing driving environment. The digital twin helps refine the simulation models of the AVs at different levels due to the test results obtained at several intermediate levels of design evolution (Figure 1).

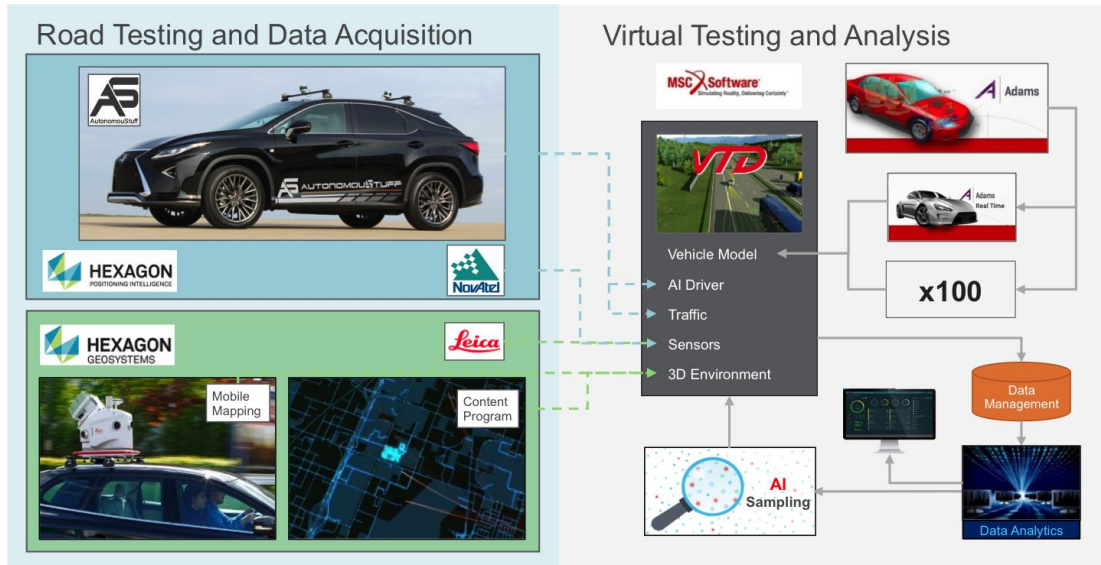


Figure 1—Hexagon MI's Open VTD Platform for Developing Autonomous Vehicles Based on Digital Twins
(Courtesy of Hexagon)

Summary

CIMdata closely monitors the trends in autonomous mobility as the technology evolves to make it economically viable for individually owned and shared AVs. The design evolution of AVs based purely on prototype testing on public roads appears to be too time-consuming for commercially viable AVs to become reality within the next decade. The main reason is that the safe and acceptable performance of AVs cannot be demonstrated in a convincing manner. However, a large number of conflict scenarios could be studied quickly through simulation, speeding up the design and the understanding of AV response, while reducing the number of physical prototypes needed along the design evolution path.

Numerical simulation has reduced the design time and cost substantially in the development of conventional vehicles, whose response is quite well understood. In the case of AVs, simulation is needed to accelerate experimentation with a large number of potential conflict scenarios to improve the artificial driver intelligence given the limitations of sensors included in the AVs. It amounts to the tuning of the artificial driver intelligence algorithms to compensate for the shortcomings of the sensor-systems, once a vehicle and the sensors are chosen for developing the AV. Without any standards or regulations dictating the development of sensors or the integration of sensor-systems, each AV design needs the driver intelligence system to be calibrated for that specific vehicle.

Hexagon MI offers several simulation capabilities for AVs, centered around its open VTD platform, such as sensor signals acquisition and processing and sensor response models, high definition maps, AV test data acquisition and processing, Adams vehicle dynamics modeling, as well as realistic driving environment modeling, for rapid learning and design iterations.

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Hexagon MI's VTD platform, with its mathematical simulation and test data processing offerings, has been applied globally in the development of automated vehicles of different levels of automation, either individually or in an integrated fashion. In CIMdata's opinion, Hexagon MI's capabilities to orchestrate the data flow between these areas in real-time is much-needed for quickly evolving the design of AVs based on simulated driven miles, instead of public road driven miles. Automotive OEMs, suppliers, and startups should evaluate Hexagon MI's VTD platform for evolving their AV designs mostly based on simulations with prototype testing at a limited number of stages.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.

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Acquisitions

ANSYS and Electromagnetic Crosstalk Solutions Leader Helic Sign Definitive Acquisition Agreement

21 January 2019

ANSYS announced today that it has entered into a definitive agreement to acquire Helic, the industry-leading provider of electromagnetic crosstalk solutions for systems on chips (SoCs). The acquisition of Helic, combined with ANSYS' flagship electromagnetic and semiconductor solvers, will provide a comprehensive solution for on-chip, 3D integrated circuit and chip-package-system electromagnetics and noise analysis. The transaction is expected to close in the first quarter of 2019. Management will provide further details regarding the transaction and its impact on the 2019 financial outlook after the closing.

Megatrends like 5G, artificial intelligence and cloud computing are driving more complex semiconductor chip design, including the increased use of on-chip signal frequencies past 2 gigahertz (GHz) and complex multiple silicon die in a single package. These increasingly complex designs often lead to electromagnetic crosstalk, when unwanted interference caused by electric and magnetic fields of one signal interferes with another signal. Helic's solutions help top semiconductor companies debug and analyze electromagnetic crosstalk issues in their advanced SoC designs and reduce the risk of silicon failure. When combined with ANSYS' solutions for electromagnetics and power-integrity noise analysis, engineers can deploy an electromagnetic-aware design methodology to design devices in all advanced nodes, optimize the die size and precisely capture electromagnetic and parasitic effects from direct current up to 110 GHz.

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Headquartered in Santa Clara, California, Helic has more than 50 employees, including locations in Greece, Japan and Ireland. Its comprehensive product suite includes electromagnetic modeling and simulation for highly complex circuits for sub-10 nanometer technologies. Helic products have been successfully deployed by worldwide customers in applications ranging from radio-frequency wireless transceivers, graphics processing units, high-speed I/Os in multi-core processors and image sensors and other internet of things connected devices.

"Electromagnetic noise is a key design challenge that is driving the need for extensive on-chip electromagnetic analysis," said John Lee, ANSYS vice president and general manager. "As the leader in multiphysics simulation, ANSYS already has the leading electromagnetic and semiconductor solutions on the market. This acquisition brings Helic's, industry leading on-chip electromagnetic solutions into the ANSYS family – complementing our leadership in power integrity noise analysis and helping our customers address the market needs driven by 5G, AI and cloud computing."

"Helic is thrilled to become part of the ANSYS family. This acquisition will bring significant benefits to both ANSYS and Helic customers," said Yorgos Koutsoyannopoulos, president and CEO of Helic. "ANSYS customers will gain easy access to on-chip electromagnetics solvers, integrated with the flagship ANSYS electronics and semiconductor tools. Helic customers will benefit from inclusion in the ANSYS platform for multi-physics and chip-package-system."

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ANSYS And Material Intelligence Leader Granta Design Sign Definitive Acquisition Agreement

22 January 2019

ANSYS announced today that it has entered into a definitive agreement to acquire Granta Design, the premier provider of materials information technology. The acquisition expands ANSYS' portfolio into this important area, giving ANSYS customers access to material intelligence, including data that is critical to successful simulations. The transaction is expected to close in the first quarter of 2019. Management will provide further details regarding the transaction and its impact on the 2019 financial outlook after the closing.

With advances in the performance of metals, plastics and other materials, including innovations in areas such as composites and additive manufacturing, manufacturers have a wealth of material choices when developing products. At the same time, they require accurate, traceable and reliable materials information to make smart materials choices and to ensure simulation accuracy. With this acquisition, ANSYS customers can benefit from access to the world's premier system for managing corporate material intelligence and the market-leading solution for materials sources, selection and management. Granta customers can expect even easier access to ANSYS' gold-standard simulation technology. Granta will continue its open ecosystem, integrating with a wide range of leading product lifecycle management, CAD and computer-aided engineering solutions.

Headquartered in Cambridge, UK, Granta Design has over 180 employees. Its products include GRANTA MI, the leading system for enterprise materials information management and CES Selector, which enables users to explore the impact that different materials have on the behavior of their products. Granta also develops CES EduPack, the world's leading teaching resource for materials topics in engineering, science, processing and design which is used by more than 1,000 universities worldwide. Granta's customers include Airbus, General Motors, Emerson Electric, Lockheed Martin, NASA, Saudi

Aramco and Rolls-Royce.

"Granta Design has pioneered the field of materials information technology," said Shane Emswiler, ANSYS vice president and general manager. "With materials engineering becoming an increasingly important aspect of product development, our customers require high-quality and comprehensive materials information for accurate simulation results. Integrating Granta's solutions into the ANSYS portfolio will provide a seamless user experience – and enable our customers to innovate like never before."

"For nearly 50 years, ANSYS has been the leader in engineering simulation," said David Cebon, co-founder and managing director of Granta Design. "Combining that expertise with Granta's decades of experience in material intelligence will help our customers make smarter decisions when developing their next-generation products."

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Onapsis Signs Agreement to Acquire Virtual Forge

16 January 2019

Onapsis today announced it has entered into a definitive agreement to acquire privately-held Virtual Forge, headquartered in Heidelberg, Germany. Onapsis's platform is the most widely-used cybersecurity solution that protects the ERP systems and business-critical applications of the world's largest organizations. Founded in 2006, Virtual Forge is the leading provider of solutions to automatically prevent, detect and remediate cybersecurity and compliance risks in customizations and extensions of SAP® applications. The combination of Onapsis and Virtual Forge will empower customers to have unparalleled visibility, incident response, management and compliance for business-critical applications.

"Organizations are continuously extending their cloud and on-premise ERP applications to support evolving business requirements, which introduces serious cybersecurity and compliance risks if not properly managed. With this acquisition, organizations will have one single partner and one single platform to secure and protect their SAP infrastructure, including segregation of duties, custom code analysis, vulnerability assessments, secure change management, compliance automation and continuous monitoring," stated Mariano Nunez, CEO and Co-founder, Onapsis Inc. "We are excited to combine the unique technology, talent and domain expertise of our companies to help organizations further secure the critical applications that run their businesses."

This acquisition will happen in a context where global organizations have become acutely aware of the urgent need to protect their ERP applications: in May of 2016, ERP application cybersecurity was brought to the forefront when the first ever Department of Homeland Security US-CERT alert for ERP business applications was released, warning organizations of cyberattacks targeting these critical applications. Since then, the trend of ERP attacks has continued to rise at an alarming rate, ranging from hacktivists and malicious insiders to cyber criminal groups and state-sponsored attacks. This is further evidenced by the second Department of Homeland Security US-CERT alert, released in July of 2018, warning of malicious cyber activity to ERP applications.

Virtual Forge's patented solutions help secure modern extensions developed on the SAP Cloud Platform for cloud business applications, including SAP S/4HANA®, SAP C/4HANA®, SAP SuccessFactors®,

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SAP Ariba®, SAP Concur® and SAP Fieldglass®, as well as traditional on-premise SAP applications developed on the SAP ABAP programming language.

“We are excited to join Onapsis in the shared vision of protecting the world’s business-critical applications. Together, we will have the most comprehensive technology portfolio in the industry, global scale and a strong team of over 300 experts in the ERP and cybersecurity domains,” stated Dr. Markus Schumacher, CEO and Co-founder, Virtual Forge.

“As an organization faced with the daily challenge of securing critical applications, we use both Virtual Forge and Onapsis solutions. However, having separate vendors and lack of integration makes it difficult for us to manage compliance and risk holistically. With this acquisition, we and all SAP customers will now have a one-stop shop for SAP cybersecurity needs, reducing resources, time and cost; consolidating reporting and compliance demands,” stated Mario Chiock, Schlumberger Fellow and CISO Emeritus.

With today’s announcement, Onapsis will continue rapid expansion into global markets, building upon Virtual Forge’s excellent international reputation. The acquisition is expected to close in the first half of 2019, subject to customary closing conditions and required regulatory approvals.

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SAP Completes Acquisition of Qualtrics

23 January 2019

SAP today announced that it has completed its previously announced acquisition of Qualtrics International Inc. Qualtrics is the global pioneer of the experience management (XM) software category that enables organizations to thrive in today's experience economy. The combination accelerates the new XM category by combining Qualtrics' experience data with operational data from SAP® software to power the economy. SAP and Qualtrics will offer businesses the means to deliver exceptional customer, employee, product and brand experiences.

Ryan Smith will continue to lead Qualtrics, which will retain its current leadership, personnel, branding and company culture and operate as an entity within the Cloud Business Group at SAP. Qualtrics will continue to maintain dual headquarters in Provo, Utah, and Seattle, Washington.

Transformative Potential of X-Data Combined With O-Data

Experience data (X-data) focuses on obtaining and tapping the value of outside-in customer, employee, product and brand feedback. Combining Qualtrics' experience data and insights with unparalleled operational data (O-data) from SAP software will enable customers to manage supply chains, networks, employees and core processes better. Together, SAP and Qualtrics will deliver a unique end-to-end experience and operational management system to power the economy.

By tapping into SAP's more than 413,000 customers and global sales force of around 15,000, Qualtrics will be able to scale rapidly around the world. SAP has a strong track record of accelerating the growth of the innovative companies it acquires, as exemplified by the rapid success of SAP's recent acquisitions.

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Company News

Accenture Named a Leader in Report for IoT Services

22 January 2019

Accenture has been named a Leader in an IoT report for the third consecutive year. It received the highest marks in the Market Impact category and was named a Star Performer based on based on year-over-year growth.

A distinguishing feature of Accenture's 2018 market success is its customer intimacy and partnership approach, which leads to high client satisfaction, according to the report.

"Our IoT capabilities help companies drive new levels of monetization and efficiency from disruptive technologies and connected intelligent devices," said Aidan Quilligan, managing director and global lead for Accenture Industry X.0. "Being named an IoT Leader... for three years in a row underscores the strength and maturity of our Industry X.0 offering, spanning Connected Products & Services, Engineering, Manufacturing, and Digital Production & Operations."

The report assesses the relative market success and overall capability of service providers. For this report, the group evaluated 19 leading service providers for their IoT capabilities based on various criteria, including infrastructure security, device and sensor engineering, platform integration, and applications and data analytics service.

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ASSESS Initiative Publishes Integration Positioning Paper

24 January 2019

ASSESS Initiative, a broad reaching multi-industry initiative to facilitate a revolution of enablement that will vastly increase the availability and effectiveness of Engineering Simulation, is proud to announce the release of the ASSESS Initiative Integration of Systems and Detailed Subsystem Simulations (Integration) Theme positioning paper with the following contents:

- Integration Theme Focus
- Integration Theme Scope
- Understanding the Drivers
- Understanding the Issues
- ASSESS Initiative Integration Theme Goals
- Preliminary Summary of Approaches Being considered
- Integration Theme Collaborations

The ASSESS initiative has been organized around a key set of themes associated with expanding the usage and benefit of Engineering Simulation.

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Align - Alignment of Commercial, Research and Government Efforts

Business - Business Challenges

Credibility - Engineering Simulation Credibility

DoES - Democratization of Engineering Simulation

Generative - Generative Design

Integration - Integration of Systems and Detailed Sub-System Simulations

Twin(s) – Engineering Simulation Digital Twin(s)

The ASSESS Initiative is planning on publishing positioning papers and Strategic Insight papers related to each of these themes. Positioning papers will be publicly available from the ASSESS Initiative website, however, ASSESS Strategic Insight papers will be made available on a “members only” basis.

The ASSESS Initiative Membership program provides the ability for the ASSESS Initiative to expand its efforts and community benefits. The ASSESS Membership Program is appropriate for all organizations engaged in Analysis, Simulation, and Systems Engineering activities related to Engineered products & processes. The ASSESS Membership Program is offered in individual or group memberships. Active ASSESS Initiative Members receive access to Members Only content on the ASSESS website and a discount on the ASSESS Congress Registration Fees.

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BNP Paribas Signs an Agreement with IBM Services to further deploy its Cloud Strategy

22 January 2019

Banks are faced with changing consumer behaviors and expectations, in areas such as real-time banking, mobile services and access to a more complete view of their financial situation. To address customers' expectations, BNP Paribas has engaged a transformation plan aiming at accelerating its digital transformation and improving the group's operational efficiency.

To address these market changes, BNP Paribas and IBM Services today announced they are extending their partnership for eight years. This partnership further extends the two companies' creation of the IT services company BNP Paribas Partners for Innovation (BP2I) – a joint venture held equally by BNP Paribas and IBM since 2003. This agreement will enable BNP Paribas to continue to deploy its cloud approach with service from IBM.

BNP Paribas, which developed its first private cloud in 2013, will now integrate the IBM Cloud hosted in data centers dedicated to the bank. BNP Paribas will also strengthen its hybrid cloud "as a service" capabilities, using IBM solutions offered via its public cloud to support the development of new services, including test and applications environments.

In line with its Cloud strategy and in order to ensure the security of its customers' data, BNP Paribas will not use the public cloud for either customer data or production environments with sensitive information.

Thanks to the expertise from IBM, this new step in the bank's cloud approach will enable BNP Paribas to gain agility, ensure the performance of its IT systems and ensure security. It is also designed to improve the "Time to Market" for new digital applications and services and the privileged access of BNP Paribas to new technologies.

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This agreement will also enable BNP Paribas to use IBM Hybrid Cloud solutions to increase its services capabilities through the usage of multiple environments, such as dedicated, public and private clouds, ensuring integration between these different environments. It will help enable the bank's ability to improve the integration and optimize the workload management between these various Cloud infrastructure services.

The new banking services and technologies developed by BNP Paribas through IBM solutions will contribute to the acceleration of the digitization of the bank, the improvement of the services offered to its customers, and the support of the development of new digital applications.

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Formetrix Hires CEO and Commits to New Headquarters in Greater Boston

17 January 2019

Formetrix, Inc., a designer and producer of proprietary, high-performance, steel alloys for additive manufacturing, has named Scott Pearson as its new Chief Executive Officer. The Company also announces that it has committed to a new headquarters in the greater Boston area with occupancy scheduled to occur in March.

“We are thrilled to attract someone of Scott’s caliber and experience to lead Formetrix as we enter our next phase of growth,” said K. Leonard Judson, a Formetrix Director and the President and Managing Director of Cycad Group. Judson continued, “Scott is the ideal person to drive the Company’s growth and operational strategies, to establish mutually beneficial partnerships with industry and customers, and to establish the company as a leader in the rapidly developing additive manufacturing materials space.”

“I am excited to join the Formetrix team and to lead the organization as we target the opportunities that exist in the 3D printing market today for our world-class, steel alloys as well as the new opportunities that our unique technologies will enable,” said Pearson. “I am also looking forward to the opening of our new, state-of-the-art facility in the coming months. The new capabilities enabled by this facility will allow our team to innovate and operate more quickly and effectively for our customers.”

Mr. Pearson is a seasoned and well-respected senior executive, with over 25 years of experience leading a wide range of technology-based companies and organizations. His professional experience spans a broad range of industries including uninterruptible power systems (UPS), fuel cells, electric vehicles, electronics assembly equipment and materials, digital imaging, stationary energy storage, and defense systems. Prior to joining Formetrix, Scott spent six years as the President and CEO of Aquion Energy, a venture-backed company focused on the development, manufacturing, and sales of advanced batteries and storage systems. Mr. Pearson holds an M.B.A. from MIT’s Sloan School of Management, an M.S. in Mechanical Engineering from MIT and a B.S. in Mechanical Engineering from the University of Massachusetts at Amherst.

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IBM & Vodafone Business Join Forces to Drive Innovation in Rapidly Changing World

17 January 2019

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IBM and Vodafone Business today announced that they are creating a new venture designed to help companies across Europe and beyond deliver innovation faster and succeed in a digital world.

Building on more than two decades of collaboration between the two companies, IBM and Vodafone have entered into a new strategic commercial agreement. It will provide clients with the open, flexible technologies they need to integrate multiple clouds and prepare for the next wave of digital transformation enabled by AI, 5G, edge and Software Defined Networking (SDN).

With more than 70 percent of organisations today using up to 15 cloud environments as they strive to access powerful new digital solutions and services*, the interconnectivity of clouds and the vulnerability of data have become global issues. Together, IBM and Vodafone Business will help companies remove the complexity and barriers from their technology choices and ensure that data and applications flow freely and securely across their organizations.

Under the new venture, Vodafone Business customers will immediately have access to the full portfolio of IBM's cloud offerings, underpinned by IBM's deep industry expertise and open technologies.

As part of the agreement, IBM will provide managed services to Vodafone Business' cloud and hosting unit, in an eight-year engagement valued at approximately \$550 million (€480 million). Customers will benefit from IBM's optimisation, automation and cognitive capabilities which help them to run their business effectively in a cloud environment.

The new venture will co-develop new digital solutions, combining the strengths of Vodafone's leadership in IoT, 5G and edge computing with IBM's multicloud, industry expertise and professional services capabilities.

"IBM has built industry-leading hybrid cloud, AI and security capabilities underpinned by deep industry expertise," said IBM Chairman, President and CEO Ginni Rometty. "Together, IBM and Vodafone will use the power of the hybrid cloud to securely integrate critical business applications, driving business innovation – from agriculture to next-generation retail."

"Vodafone has successfully established its cloud business to help our customers succeed in a digital world," said Vodafone CEO Nick Read. "This strategic venture with IBM allows us to focus on our strengths in fixed and mobile technologies, whilst leveraging IBM's expertise in multicloud, AI and services. Through this new venture we'll accelerate our growth and deepen engagement with our customers while driving radical simplification and efficiency in our business."

The convergence of multicloud and connectivity promises to speed decision-making, enhance automation and personalize experiences for end users in any location – even some of the most remote. For example, in the past, innovating on an oil rig would have been a challenge due to lack of connectivity and disparate IT systems. Today, thanks to edge computing and IoT technologies from Vodafone working with the latest AI and augmented reality applications from IBM, engineers will be able to pinpoint and resolve faults on equipment in minutes rather than hours, potentially saving millions in lost productivity.

Combining the capabilities of two industry leaders under one roof with dedicated executive leaders from both companies, the new venture is designed to act like a start-up and be responsive to rapidly changing market and customer demands. New digital solutions and services will be built using the latest agile methodologies.

The new venture will be operational in the first half of 2019.

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Industry 4.0 partnership formed between Swinburne, IMCRC and Sleep Corp

21 January 2019

A partnership has been formed between Innovative Manufacturing Cooperative Research Centre (IMCRC), Swinburne University of Technology and Sleep Corp to boost advanced manufacturing in Australia.

The partnership is to analyse Sleep Corp's business and see what improvements can be made as they move towards Industry 4.0, with a view to move to fully automated manufacturing.

Over two years, researchers from Swinburne will work closely with Sleep Corp to set up a Virtual Manufacturing System (VMS) that connects robotics-based machinery to a digital twin that will attempt to provide a faster and more flexible manufacturing approach to address changing customer requirements while maintaining cost competitiveness for the company's range of products.

"Swinburne is at the forefront in delivering to Australian industry using transformative augmented and virtual reality tools," said Dr Ambarish Kulkarni, who is a senior lecturer in computer aided engineering at Swinburne.

"Industry 4.0 has been implemented previously in manufacturing industries by Swinburne with sustained productivity and quality gains."

Researchers will connect and integrate all manufacturing operations ranging from tailoring, cutting and sewing to packaging in one VMS application which then will be linked to SleepCorp's enterprise resource planning (ERP) and data analysis/analytics to provide enhanced visibility across the manufacturing value chain.

"This is another great example of how smart companies can collaborate with Australian Universities to undertake joint Industry 4.0 research and development programs that deliver real world outcomes," said David Chuter, the CEO and managing director of IMCRC.

"Sleep Corp's goal is to continue to be a proud Australian-owned and made manufacturer, exceeding retailers and consumers expectations alike, on a world stage, with an extraordinary offer that is delivered as efficiently and as cost effectively as possible," said David Kaplan, founder and managing director of Sleep Corp.

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InRiver Expands Executive Bench and Growth Initiatives for 2019

21 January 2019

InRiver today elevated veteran sales executive Jimmy Jeppsson Bäckström to chief revenue officer, and named Johan Eriksson to chief financial officer, rounding out the executive team additions that included Thor Johnson, chief executive officer, Eric Waller, chief technology officer and executive vice president of product, Maria Bolmstedt, vice president of services, and Steve Gershik, chief marketing officer in 2018.

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The past year yielded tremendous growth for inRiver as the organization continued to strengthen its presence in North America and expand operations in Europe with 40% increase in new customer logos and more than 50% increase in recurring revenue.

New customers in retail and branded manufacturing within the fashion, construction, accessories, medical devices, food and beverage, and furniture verticals have grown the inRiver community to over 1,500 brands and 500 customers globally.

“Customer demand for a clear and consistent online and offline experience is driving digital transformation worldwide. inRiver powers these global retail and industrial brands to engage their buyers and consumers everywhere, in any language, through any medium,” said Johnson. “Our experienced leadership team is focused on compressing the entire process of bringing products to market, online and offline for the very best customer experience. We have high expectations for 2019 in this exploding marketplace.”

Early in 2019, inRiver customers and partners can expect:

- New product releases to address customer syndication and contribution challenges
- e-learning modules to support services and training offerings
- Sixth annual PIMpoint Summit in Malmö, Sweden with 1,000 marketers, e-commerce and PIM experts
- More Unified Commerce Alliance events and engagement supporting seamless e-commerce

[!\[\]\(e3f8612927870f2e0f9f5989e6dd3064_img.jpg\) Click here to return to Contents](#)

Kai Gärtling To Lead Verisurf Software Expansion in Germany

14 January 2019

Verisurf Software announced it has appointed Kai Gärtling to the position of Regional Sales Manager, Germany. In his new role, Mr. Gärtling will be responsible for expanding brand awareness and sales of Verisurf Software throughout Germany and other German-speaking regions of Europe.


“Kai Gärtling is uniquely qualified to represent Verisurf,” said Ernie Husted, President, and CEO; “with more than 25-years of experience, providing 3D measurement and integrated metrology solutions to automotive and aerospace customers in Germany, Kai can quickly assess customer needs and make expert metrology recommendations.”

“I am very pleased to be part of the Verisurf sales and support team in Germany. The Power of Verisurf Software combined with knowledgeable application engineers and technical support staff, delivers highly efficient and valuable measurement solutions,” said Mr. Gärtling; “as model-based measurement and inspection solutions continue to be adopted by mainstream manufacturing companies, Verisurf stands out with its open CAD-based platform and compatibility with all brands and models of coordinate measuring machines. This represents an opportunity for customers and Verisurf alike and I’m excited to be part of it.”

Kai Gärtling began his career in metalworking as a studied master mold maker for metal stamping in Paderborn, Germany. After several years, he moved into metrology services, starting a 3D measurement company and later a CAD/CAM services company, which provided reverse engineering, design, and

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manufacturing engineering. As Key Account Manager at FARO, Mr. Gärtling worked closely with Volkswagen, Mercedes Benz, and Airbus to help implement best practices in automated measurement, inspection, and reporting.

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Lectra strengthens its Executive Committee

15 January 2019

Lectra is strengthening its Executive Committee to accelerate the implementation of its Lectra 4.0 strategy, initiated in early 2017, with the objective of becoming a key player in the Industry 4.0 market.

Lectra's 2017-2019 strategic roadmap, the first step in the company's transformation, has five objectives: accelerate revenue growth, both organic and through targeted acquisitions; accentuate its technological leadership to further enhance the value of its products and services offer; strengthen its competitive position and long-term relationships with customers; progressively launch new software offers in SaaS mode; and self-finance its internal and external development.

To empower its customers in implementing the principles of Industry 4.0, Lectra has, over the past three years, significantly increased investments in the design and development of new product lines and in complementing its existing software and cutting solutions. The company relies mainly on four key technologies: Big Data, Artificial Intelligence, the Industrial Internet of Things and the Cloud. Lectra's first Industry 4.0 offers were launched in 2018 in some countries as a pilot and will be progressively rolled out worldwide in 2019.

Until now, Lectra's Executive Committee was composed of Daniel Harari, Céline Choussy, Edouard Macquin, Jérôme Viala and Véronique Zoccoletto. In order to accelerate the execution of its strategy, the group has decided to review the organization of its subsidiaries, refocus efforts toward Customer Success, and expand its Executive Committee, which remains under the chairmanship of Daniel Harari, Chairman and Chief Executive Officer.

Jérôme Viala, Executive Vice President, is now Vice-Chairman of the Executive Committee, with increased responsibilities on subsidiary operations, while maintaining his current duties.

Lectra's subsidiaries are newly organized into four main regions. The purpose is to better adapt the Lectra 4.0 strategy to Lectra's different markets, accelerate business development and strengthen synergies within each geographical area. The new regions are Americas, led by Edouard Macquin; Asia-Pacific, led by Javier Garcia; Northern & Eastern Europe, Middle East, led by Holger Max-Lang; and Southern Europe & North Africa, led by Fabio Canali. Fabio Canali, Javier Garcia and Holger Max-Lang join the Executive Committee.

To be even closer to its customers' needs and guarantee optimum use of its solutions, Lectra has created the position of Chief Customer Success Officer, headed by Laurence Jacquot, who joins the Executive Committee.

Maximilien Abadie, Chief Strategy Officer, becomes a member of the Executive Committee, with the mission to support the implementation of the Lectra 4.0 strategy within the group's teams and prepare the 2020-2022 strategic roadmap.

Olivier du Chesnay, Chief Financial Officer, joins the Executive Committee with the objective to

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strengthen the fundamentals of Lectra's economic model.

Céline Choussy, Chief Marketing & Communications Officer, will have as her main mission to ensure the launch and development of new offers.

Véronique Zoccoletto, Chief Transformation Officer, will focus on escalating Lectra's ongoing digitalization and use of the four key technologies.

"Our growth plan is ambitious and we had to put in place a structure that enables us to quickly achieve our objectives. The new dynamic of our regions, together with the creation of a dedicated Customer Success team, will further strengthen the intimacy we share with our customers. I have worked for a long time with each member of this new Executive Committee, and I have admired and appreciated over the years their passion for Lectra and the depth and range of their talents. We have a more robust and cohesive management team in which I have every bit of confidence to take Lectra to a new and important stage in its development," says Daniel Harari.

Detailed biographies of Lectra's Executive Committee are available on lectra.com

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Progman unifies its brands under MagiCAD

21 January 2019

Progman Oy and its subsidiary companies have been renamed to MagiCAD Group. MagiCAD is a leading software for MEP design and a well-recognised brand in the BIM community. The rebranding allows MagiCAD Group to promote a single brand image globally and to unify its product portfolio.

Progman has unified its brands under MagiCAD. After the rebranding Progman Oy and its subsidiary companies CADCOM AB and Progman Software UK Ltd, have been renamed to MagiCAD Group. In addition to this, the online service MagiCloud has been renamed to MagiCAD Cloud.

Although the two originator companies for MagiCAD Group (Progman and CADCOM) consolidated years ago, they continued to promote independent brands. By unifying its branding under MagiCAD, MagiCAD Group aims to deliver “one experience” to its consumers and partners that is easily memorable, innovative, and reliable.

The current rebranding program harmonizes the MagiCAD product offering under a single, unified name. MagiCAD Group’s flagship software for MEP design, MagiCAD, serves the needs of customers in more than 80 countries. As a 20-year old product brand that is well known globally both for having pioneered the 3D modelling of MEP systems, as well as for its continuous contemporary innovation, MagiCAD was an obvious choice as the new brand.

The single brand unification of MagiCAD Group extends throughout its product portfolio. MagiCloud, the world’s largest online library of manufacturer verified BIM objects for MEP, has been redesigned and renamed to MagiCAD Cloud and the rebranding of MagiCreate, a custom BIM object creation software, to MagiCAD Create will follow soon after.

Together with the rebranding, the MagiCAD web site has also been redesigned for a consistent, professional and inspiring MagiCAD experience.

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SAP NS2® Announces Strategic Partnership with Google Cloud

24 January 2019

SAP National Security Services, Inc. (SAP NS2®), a U.S. based independent subsidiary of SAP, today announced a strategic partnership with Google Cloud. The partnership between SAP NS2 and Google Cloud will allow SAP NS2 customers in the public sector to leverage SAP HANA's in-memory database with Google Cloud Platform (GCP) to accelerate their digital transformation and convert data into actionable insights and business outcomes, while still meeting FedRAMP's requirements for a standardized approach to security assessment, authorization and continuous monitoring of cloud products and services.

SAP NS2 customers in the public sector can now utilize SAP HANA® on GCP to deliver real-time insights and run mission-critical applications and analytics, all on a scalable and secure cloud infrastructure. The partnership will bring together SAP software, SAP NS2's secure cloud delivery services and Google Cloud Platform's infrastructure into one cloud service offering.

"Our alliance with Google Cloud provides our customers with the choice to leverage GCP's rich network infrastructure and suite of operational capabilities for the public sector," said Mark Testoni, president and chief executive officer of SAP NS2. "Our customers may now access the full power of SAP HANA to innovate in a secure cloud environment, further bolstered by Google Cloud's world class security and operations capabilities."

The new offering to customers will operate under the framework of FedRAMP, a government-wide program created to save time and costs by enabling rapid procurement of information systems and services, eliminating duplicate assessment efforts and ensuring consistent application of information security standards across all government organizations. Customers will have access to 24/7 FedRAMP support at no premium.

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Sovrin Network Expands Global Reach

22 January 2019

The Sovrin Foundation, the international nonprofit that administers the Sovrin Network, today announced it has welcomed Chain Partners, CynjaTech, NEC, and Tech Systems Limited as its newest Founding Stewards. These organizations are dedicated to enabling self-sovereign identity for all and join a diverse ecosystem of more than 60 organizations around the world that help support the operation of the Sovrin Network—a decentralized network allowing identity holders to personally manage their own digital identifications.

"The number and variety of industries joining the Sovrin Network as Stewards, and their spread across the globe are increasing evidence of a global revolution in digital identity," said Heather Dahl, Executive Director & CEO of the Sovrin Foundation. "We at the Foundation, believe in a world where self-sovereign identity is available to all, allowing people to own and control their identity in the same way they do offline. We are grateful for our Stewards that help make this mission possible as they

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continue to strengthen the security and reliability of the Sovrin Network.”

Chain Partners is a global blockchain company builder in South Korea and the first Steward in the Korean peninsula. The organization’s primary business areas include cryptocurrency exchange, blockchain advisory, cryptocurrency payments, financial services, blockchain media, education, and research and development. Its expertise in blockchain-related technologies makes Chain Partners a valuable asset to the Sovrin community.

"For the first time in history, every man, woman, and child (or organization) can have their very own self-sovereign digital identity," said Richard Kim, Vice President of Chain Partners. "Chain Partners is honored to be selected as a Sovrin Steward, and our team aims to leverage our previous experiences in blockchain to bring sustainable, value-creating outcomes in the Sovrin ecosystem."

CynjaTech is a US-based EdTech company focused on teaching children and other exploited populations how to navigate their digital lives in privacy preserving ways. The company is currently working on a proof of concept that would use the Sovrin Network to offer privacy, security, data control, and a digital identity to children as they learn to navigate the Internet.

"We are excited to be selected as a Sovrin Steward," said Scott Harris, Vice President of Business Development for CynjaTech. "For years, our technology has been protecting children and their families. We believe that Sovrin will give the next generation a digital life where they have control and ownership of their most basic human right—their identity. That’s why CynjaTech is proud to support the Sovrin Network."

NEC Corporation is an international IT solutions enterprise that focuses on solving the social issues that the world faces using information and communication technology and aims to achieve safety, security, efficiency, and equality to enrich people's lives. Being the first Sovrin Steward in Japan, NEC hopes to be a leading contributor to the popularization of self-sovereign identity in that country.

"Self-sovereign digital identity will be essential for digital inclusion and human-centric data sharing," said Daichi Iwata, Head of Digital Identity Team at NEC Corporation.

Tech Systems Limited provides comprehensive IT based solutions, procurement services, and specialized engineering services for the public and private sectors. As the first Steward in Nigeria, Tech Systems Limited envisions the Sovrin Network as a tool with the capability to provide self-sovereign identity to the country’s more than 180 million citizens.

"Tech Systems has been adding value to its Nigerian public and private sector clients for over 31 years," said Ken Spann, Technical Advisor at Tech Systems Limited. "We are excited and humbled to install the first and only Sovrin node in Nigeria and West Africa. Nigeria, like many countries, is looking to harmonize its many identity databases, and we believe Sovrin may allow, for the first time, every citizen to have and control their own identities. We see Sovrin as providing a key element missing from the Internet—a global public utility for identity—that will one day be used to verify identities as DNS is used to track machines on the Internet. The days of individuals having scores of identities, which they do not own or control, are coming to an end. This will have a tremendous impact on driving economic growth across Africa."

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Chain Partners, CynjaTech, NEC, Tech Systems Limited, and all other Stewards have agreed to abide by the principles and requirements established in the Sovrin Governance Framework, the legal foundation of the Sovrin Network.

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Winner Announced for the 2018 Altair Feko Student Competition

24 January 2019

Altair is pleased to announce that Didier Goulet-Tran, an under-graduate student from Polytechnique Montreal, Canada, is the winner of the 2018 Altair Feko™ Student Competition.

"It is so inspiring to see the innovative thinking of these students with our software," said Matthias Goelke, senior director, business development academic markets, Altair. "The students gain valuable experience with Feko, our computational electromagnetic (CEM) tool, a world-leader in the EM field for the automotive, aerospace, defence, communications, consumer electronics, energy, and healthcare industries. This also helps their future engineering careers."

Goulet-Tran's entry utilized Feko to design planar reflect array antenna, where the whole antenna system can be folded on one side of the satellite and saving space for CubeSat application. The challenge in the design of reflect array is to choose the shape of the printed surfaces to form a collimated beam over a reasonable bandwidth. The designed reflect array was fabricated and its performance validated using measurements in anechoic chamber achieving a bandwidth of 6.5%.

"I am very pleased that the judges recognized my work and I wish to thank everyone who was involved during this project. This prize will be a source of motivation for years to come," said Goulet-Tran on receiving the news of his win.

Professor Jean-Jacques Laurin, Didier's advisor commented "I am very happy and proud for Didier. I think it is a great achievement for an undergraduate student to win this competition. We have used Altair Feko in many of our academic research projects as well as in the classroom and will continue to do so for years to come."

The two honourable mentions were Vignesh Manohar from UCLA, California, USA and Sumitra Dey from University of Missouri, Kansas City.

This annual international contest organized in support of engineering education and academic excellence, has been running for 16 years and continues to generate global interest, attracting entries from Argentina, Australia, Canada and the USA this year. The competition is designed for students interested in antennas, microwave devices, bio-electromagnetics, electromagnetic compatibility, and other electromagnetic related fields and gives them the opportunity to showcase their work with electromagnetics solver Feko, part of the Altair HyperWorks™ suite.

The winning project titled, "Design, fabrication and characterization of a K band reflect array antenna

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for use in a “CubeSat” application,” and the honourable mentions are available for download via this [link](#).

Details about the newly revised 2019 Feko Student Competition will be announced early in March 2019 on the Altair University website.

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Events News

Anark a Gold Sponsor of The 2019 PTC/USER Technical Winter Open Forum

23 January 2019

Anark is proud to be a Gold sponsor of the 2019 PTC/USER Technical Community Winter Open Forum, and we look forward to meeting with our many PTC customers using Anark's Enterprise Content Management and Visual Collaboration platform to transform, publish, and manage their critical engineering, manufacturing and operational data as role-specific 3D PDF documents, HTML5 web content, and advanced digital workflows to empower connected, information-rich data exchange and collaboration on virtually any desktop, mobile, or wearable device along the Digital Thread.

As a longstanding Industry Partner, Anark works closely with PTC to seamlessly integrate with Windchill, Creo and ThingWorx Navigate, enabling our shared customers to communicate and collaborate more effectively and securely throughout engineering, manufacturing, supply-chain and field service operations.

Please come by the exhibition area where the Anark team will demonstrate the latest Anark product capabilities that our PTC customers rely on to successfully drive their connected, collaborative, information-rich Digital Thread and 3D MBE initiatives.

Anark is also presenting the session entitled Anark Technical Enterprise Content Management & The Connected Digital Enterprise where attendees will learn how Anark's modern, "MBE-enabled" Technical Enterprise Content Management and Visual Collaboration platform powers the Digital Transformation initiatives of leading global OEMs and their suppliers, enabling them to come to market faster, with higher quality products, at substantially reduced costs. During this session, Anark will showcase the latest advances in technical data exchange, activity-based visual collaboration, and 3D MBE as powerful processes and technologies that enable more effective, connected, and secure collaboration between OEMs and their suppliers.

We hope to see you this week at 2019 PTC/USER Winter Technical Forum to provide you with a personal demonstration of Anark Core and MBEWeb, the Anark Navigate TDP Applications, and to learn more about your needs and objectives, and to highlight some of the latest Anark customer performance metrics and success stories.

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Fisher Unitech and MISUMI USA Present Rapid Design Experience Dallas

22 January 2019

Fisher Unitech and MISUMI proudly invite you to a night of networking, some drinks, and some fun on Monday, February 11th. Join us for a relaxed night, along with a little bit of education, to learn how to stop the need for toggling between web browsers and SOLIDWORKS.

During this event, check out our live demo stations and presentations. Learn how to streamline your design process with MISUMI components and import MISUMI SOLIDWORKS parts and subassemblies directly into SOLIDWORKS 2015-2018 with inCAD Components.

Mon, February 11, 2019

6:00 PM – 10:00 PM CST

Alamo Drafthouse Cinema Cedars

Dallas, TX 75215 USA

Free with registration

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HCL 2030 Ecosystem Platform to Explore Societal Implications of Emerging Technology at the World Economic Forum

21 January 2019

HCL Technologies (HCL) today announced its largest presence to date at the side-lines of World Economic Forum's Annual Meeting in Davos scheduled from 21st January 2019 to 25th January 2019. The company will host a three-day event in a special Pavilion that will feature a technology showcase, thought-leadership programs, as well as a number of high-level networking and social events throughout the tenure of the conference.

The overarching theme of the HCL and Fast Company programs will explore how humanity's relationship with technology will evolve through the next decade of rapid innovation. HCL has partnered with Fast Company to develop a thought-leadership track that includes three panel discussion breakfasts. As part of the theme of Human-Machine Harmony, HCL is launching the HCL 2030 Platform, together with its ecosystem of partners and stakeholders, that will conduct in-depth explorations and discussions with leading innovators and future leaders driving change across digital technologies, disruption in banking and financial services, the human capital equation, and the future of product innovation. Fast Company will leverage the HCL Pavilion to host expert panels, conduct in-depth interviews, and share compelling stories focused on global innovation and solutions.

The HCL Pavilion will also include a Tech Showcase Zone, representing transformational examples of how technology – such as AI, Automation, Machine Vision, and Brain Computing – has impacted human lives. HCL will use the Pavilion as a location for nightly special events, including celebrations of technology enabling diversity, technology's transformational role in sports, and global philanthropy.

“HCL has been a Strategic Partner of the World Economic Forum for over a decade, and we have been working very closely with the Forum to contribute and collaborate on the most pressing challenges and opportunities facing society and the global economy today. Hosting a series of dialogues around the

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Annual Meeting is a very exciting new step we are taking on this journey,” said C Vijayakumar, President & CEO, HCL Technologies. “Going forward, we believe that the Fourth Industrial Revolution will need the interface of technology to solve some of the world’s hardest problems, and, having worked closely on ways to close this gap in the human / technology equation, we welcome this opportunity to showcase our efforts among the world’s leading minds gathering at Davos this year.”

For more information, visit: <https://www.hcltech.com/world-economic-forum-2019>.

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The VinylPlus Sustainability Forum 2019 – May, Prague

24 January 2019

The VinylPlus Sustainability Forum (VSF) is VinylPlus' annual event that aims to engage in open and constructive dialogue on topics concerning the PVC industry in the context of sustainability and the circular economy, and doing so with a wide range of industry and external stakeholders.

In Prague, on the 9th and 10th May 2019, the VSF2019: Accelerating Innovation will take place.

Background

The sustainable growth of society as a whole is only possible through the balancing of the three pillars of sustainability; economic, social and environmental. In this context, innovation is key.

As countless new technologies have developed in the past decades, new methods and tools are accelerating innovation throughout all industries, encouraging sustainable development.

The PVC industry’s journey towards sustainable development already began nearly 20 years ago. Today, as innovative technologies continue to develop, we ask ourselves: how is innovation supporting the PVC industry's targets in the context of the circular economy? What challenges and opportunities are today's innovative technologies providing the PVC industry? How are they Accelerating Innovation towards sustainable development throughout the industry?

Through a focus on each sustainability pillar, the speakers and discussions of the VSF2019 will explore pressing questions concerning the PVC industry and sustainability;

- Following the growth in the use of recyclates, what is the right market balance for the use of virgin and recycled PVC? What is the competitiveness of PVC products over their whole life cycle? How is the building and construction sector adapting to digital times?
- The shift towards social sustainability demands increased innovative approaches in education and the development of new skills. Is Europe - and the world - ready and capable of this task? How can we efficiently develop technologies and digital solutions that we can trust and use correctly?
- Innovative tools and methods supported by digitalization are helping companies sustainably develop their long-term business strategies, for example by assessing their environmental footprints. How are innovations like these impacting and changing the PVC industry?

The 2 day event will centre around speeches, open and interactive debate and quality panel discussions, and will host a number of industry and market experts as well as distinguished speakers from the European Commission and Parliament, the United Nations, academia and NGOs, to name but a few.

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Register for the VSF2019 to be involved with the debate, and expect a hearty welcome to Prague, a dynamic Networking Dinner and a visit to a Czech landmark!

To learn more, please visit <https://vinylplus.eu/community/vinyl-sustainability-forum>

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Financial News

PTC Announces First Quarter Fiscal Year 2019 Results

23 January 2019

PTC reported financial results for its fiscal first quarter 2019. Financial Summary - ASC 606 (1)

- Revenue of \$335 million
- GAAP net income was \$21 million or \$0.18 per diluted share; non-GAAP net income was \$67 million or \$0.56 per diluted share
- GAAP operating margin of 9%; non-GAAP operating margin of 27%

Financial Summary ASC 605 (1)

- Revenue of \$339 million
- GAAP net income was \$19 million or \$0.16 per diluted share; non-GAAP net income was \$68 million or \$0.57 per diluted share
- GAAP operating margin of 10%; non-GAAP operating margin of 28% (1)

We adopted ASC 606 on October 1, 2018, which impacted our reported financial results, including the timing and classification of revenue. For comparability purposes, and unless otherwise specified, the amounts included in the commentary below refer to results under ASC 605, as shown in our financial statements, including the notes thereto.

“Our financial performance in the first quarter was solid, with revenue, operating margin and EPS results exceeding our expectations,” said James Heppelmann, President and CEO. “We continued to make important strides against our major strategic initiatives during the quarter, most notably, we successfully completed our transition to a subscription business model.”

Please [click here](#) to view the full results.

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Implementation Investments

CACI Awarded \$73 Million to Provide Systems and Computer Engineering to Naval Surface Warfare Center

23 January 2019

CIMdata PLM Industry Summary

CACI International Inc announced today that it was awarded a \$73 million prime contract to provide computer program engineering services to the Naval Surface Warfare Center, Dahlgren Division (NSWCDD). The five-year contract is an outcome of CACI's recent acquisition of the Systems Engineering and Acquisition Support Services Business Unit.

NSWCDD develops, tests, and certifies advanced naval warfare technology. Under the contract, CACI will assist NSWCDD with systems and computer engineering, research and development, integration, and deployment support for surface warfare systems. The company's expertise in virtualization – which includes developing virtual copies of complex systems – enables the Navy to assess the effects of adding new software and capabilities to surface warfare vessels prior to deployment.

John Mengucci, CACI's Chief Operating Officer, said, "In an increasing hostile global environment, the Navy has an ongoing need to maintain maritime superiority and stay ahead of evolving threats. CACI not only enables the Navy to rapidly field powerful new capabilities, our use of cutting-edge technology significantly lowers their cost of doing so."

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Finest Shoes Puts Best Foot Forward with Infor and Venistar

24 January 2019

Infor today announced that Finest Shoes, an Italian footwear manufacturer and owner of the Atlantic Stars brand, has selected Infor M3 Fashion with Infor Accelerator for Fashion. As part of a strategy to expand internationally, the application will be deployed by Infor partner and digital fashion specialist Venistar, and is expected to support strategic decision making, enhance visibility and boost production at the fashion footwear brand.

Following the acquisition of a majority stake in the business by private equity firm Alcedo, Finest Shoes needed to modernise its systems and establish a foundation for future business growth. Specifically it required integrated ERP capabilities which could support the specific requirements of the fashion industry, and could scale as the company pursues expansion into new markets.

Infor M3 Fashion, supported by Venistar, was selected based on its deep industry-specific functionality and ability to scale. Infor Accelerator for Fashion speeds up the implementation process and establishes a clear set of best practice guidelines from the outset.

"As the fashion industry globally is seeing substantial growth right now, expanding market share means addressing an increasing number of challenges and complexities," comments Sonia Lorenzet, Chairman, Finest Shoes/Atlantic Stars. "Through our deployment of Infor we will be provided with full integration and visibility of everything from finance and administration through to stock management, production and distribution, together with business intelligence to allow us to make more informed decisions about the business. This is invaluable as we pursue our expansion plans and consolidate our brand."

"For fashion businesses, the question as to whether to modernise systems is not so much as, but when," comments Franco Dama, Channel Sales Director, Infor. "Clearly those who recognise both the opportunity and the challenges ahead, and establish the right systems to address both, will be in the best position to react to customer demand and deliver new styles which will boost revenue and brand awareness. Our applications have been designed in recognition of the specific complexities inherent in the fashion industry and therefore allows fashion companies to capitalise on growth opportunities to win

market share."

"Italian fashion & luxury businesses are seeing increasing pressure to bring new collections and styles to market faster than ever," comments Roberto Da Re, CEO, Venistar. "To keep pace with this demand, innovate and build brands in a competitive sector, fashion businesses must continually modernize and for many, this means digitalisation. Through its deployment of Infor M3 Fashion, Finest Shoes is set to build upon past success to thrive as a market leader as it embarks upon its international expansion in the coming years."

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IBM & Vodafone Business Join Forces to Drive Innovation in Rapidly Changing World

17 January 2019

IBM and Vodafone Business today announced that they are creating a new venture designed to help companies across Europe and beyond deliver innovation faster and succeed in a digital world.

Building on more than two decades of collaboration between the two companies, IBM and Vodafone have entered into a new strategic commercial agreement. It will provide clients with the open, flexible technologies they need to integrate multiple clouds and prepare for the next wave of digital transformation enabled by AI, 5G, edge and Software Defined Networking (SDN).

With more than 70 percent of organisations today using up to 15 cloud environments as they strive to access powerful new digital solutions and services*, the interconnectivity of clouds and the vulnerability of data have become global issues. Together, IBM and Vodafone Business will help companies remove the complexity and barriers from their technology choices and ensure that data and applications flow freely and securely across their organizations.

Under the new venture, Vodafone Business customers will immediately have access to the full portfolio of IBM's cloud offerings, underpinned by IBM's deep industry expertise and open technologies.

As part of the agreement, IBM will provide managed services to Vodafone Business' cloud and hosting unit, in an eight-year engagement valued at approximately \$550 million (€480 million). Customers will benefit from IBM's optimisation, automation and cognitive capabilities which help them to run their business effectively in a cloud environment.

The new venture will co-develop new digital solutions, combining the strengths of Vodafone's leadership in IoT, 5G and edge computing with IBM's multicloud, industry expertise and professional services capabilities.

"IBM has built industry-leading hybrid cloud, AI and security capabilities underpinned by deep industry expertise," said IBM Chairman, President and CEO Ginni Rometty. "Together, IBM and Vodafone will use the power of the hybrid cloud to securely integrate critical business applications, driving business innovation – from agriculture to next-generation retail."

"Vodafone has successfully established its cloud business to help our customers succeed in a digital world," said Vodafone CEO Nick Read. "This strategic venture with IBM allows us to focus on our strengths in fixed and mobile technologies, whilst leveraging IBM's expertise in multicloud, AI and services. Through this new venture we'll accelerate our growth and deepen engagement with our customers while driving radical simplification and efficiency in our business."

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The convergence of multicloud and connectivity promises to speed decision-making, enhance automation and personalize experiences for end users in any location – even some of the most remote. For example, in the past, innovating on an oil rig would have been a challenge due to lack of connectivity and disparate IT systems. Today, thanks to edge computing and IoT technologies from Vodafone working with the latest AI and augmented reality applications from IBM, engineers will be able to pinpoint and resolve faults on equipment in minutes rather than hours, potentially saving millions in lost productivity.

Combining the capabilities of two industry leaders under one roof with dedicated executive leaders from both companies, the new venture is designed to act like a start-up and be responsive to rapidly changing market and customer demands. New digital solutions and services will be built using the latest agile methodologies.

The new venture will be operational in the first half of 2019.

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IonQ Chooses Onshape's Cloud CAD Platform for Quantum Computer Design

22 January 2019

IonQ has chosen Onshape as its primary CAD and data management platform. Onshape is an all-in-one cloud design platform that combines CAD, release management, workflow, and real-time collaboration tools to speed up product development.

Quantum computers harness the unusual physics of very small particles – quantum mechanics – to solve problems that are beyond the capability of conventional devices. To achieve this potential, they must isolate and manipulate quantum systems to create quantum versions of computer bits, called “qubits.” Engineers around the world have been racing to build computers that can control more qubits, for longer calculations, and with fewer errors.

Receiving unanimous support in the U.S. Senate, the National Quantum Initiative Act was signed into law in 2018, granting more than \$1.2 billion in quantum computing R&D funding over the next five years. The National Academies of Sciences recently declared quantum computing research to be an urgent strategic priority for national security.

“A quantum computer is an enormously complex device with thousands of individual parts,” says Jonathan Mizrahi, Director of Hardware at IonQ. “So it's of vital importance that this massive assembly have up-to-date parts, and we know what's final and what we're still editing. I like that Onshape's version control is automated. Everybody sees what everybody else is doing immediately.”

With Onshape's real-time data management, whenever an engineer makes a change or edit to their 3D CAD model, everyone on the design team instantly sees it. A comprehensive Edit History also records who made what changes and when, allowing the team to return to any prior state of the design at any time.

“Onshape gives us confidence that we always have the newest version and that everything is going to fit together as expected,” Mizrahi says.

“The quantum computing age is still in its infancy, but IonQ's powerful technology will soon make today's computers seem like toys,” says Onshape CEO Jon Hirschtick. “We're proud that Onshape is

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helping IonQ reach their goals faster and significantly improve communication between their teams.”

Mizrahi adds that Onshape’s real-time data management is a vast improvement over using a Product Data Management (PDM) system, which he previously relied on to keep track of thousands of parts when he did academic research on quantum computing technology.

“This is a big collaborative process. There are electronic components, optical components, vacuum chamber components, pieces we get from vendors and parts we’re making ourselves. All of these things need to interface and work together,” he says. “The most frustrating thing about using PDM is that any given part has an owner – and until that owner checks the file back in and releases ownership, nobody else can edit that file.”

“The whole check-out/check-in process of PDM really slowed us down,” Mizrahi says. “Of course, with Onshape we no longer have to deal with that.”

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Lifestyle UK Womenswear Brand hush Plans Future with Centric PLM

22 January 2019

hush, the UK fashion and lifestyle brand, has selected Centric Software’s Product Lifecycle Management (PLM) solution.

hush is a UK-based women’s fashion and lifestyle brand that sells clothing, footwear and accessories online and through 33 concessions via the UK department store chain John Lewis. Creative director and owner Mandy Watkins set up the company in 2003 from her kitchen table and hush has now grown to become a £30 million business. With an emphasis on effortless style, hush produces chic and comfortable clothing for women of all ages who value quality as well as fashion.

Because of the rapid growth of the business, hush recently got to a point where their previous systems needed to be updated or replaced.

As Rupert Youngman, Managing Director at hush, explains, “With the business growing quickly, our previous ways of working and systems could not easily cope with the increased complexity associated with more internal stakeholders, a broader supply base and a greater number of seasonal collections, as well as our plans for future growth.

“There was a lot of inefficiency with manual workarounds and duplication of effort, as well as opportunity for error. We decided that investing in a PLM solution would help make the whole management of the supply chain from range planning through design to production more robust and would also support our growth plans.”

hush considered options from several PLM vendors before choosing Centric Software’s PLM solution.

“We wanted a system that would meet our immediate and future needs,” says Youngman. “Centric stood out from the competition, not just because of the quality and scope of the product, but because of its scalability. It is a standalone specialist PLM solution. From our conversations with the Centric team, demonstrations of the core product as well as the optional modules and the quality of their client list, we are confident that we have selected a partner who will help us drive the business forward.”

As Youngman says, “Centric PLM will make our business more agile, so we will be better able to meet

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challenges and take advantage of opportunities that the next few years will present. We expect PLM to improve efficiencies, help us implement new and better ways of working, enhance communication internally and with our suppliers, and ultimately help us provide a better product to our customers.

“The choice of partner in any system implementation is very important and we believe Centric will help us keep up with rapid changes in the fashion sector through access to platform enhancements, additional modules and a wealth of industry knowledge.”

“We would like to welcome hush as our latest partner in the UK,” says Chris Groves, President and CEO of Centric Software. “hush has grown at a tremendous rate since the brand was founded in 2003 and we are excited to play a major part in their company-wide overhaul of systems and plans for future growth.”

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Original Marines Selects Aptos To Optimize Merchandise and Assortment Planning

23 January 2019

Aptos, Inc. today announced that Italian clothing brand Original Marines has selected Aptos Merchandise Financial Planning and Assortment Planning solutions.

The Aptos solutions will help Original Marines set its strategic collection targets, derive buying and assortment strategy decisions, and manage the in-season review, optimizing product distribution and stock levels throughout the season.

“The collaboration with Aptos fits into our multichannel strategy and will span our stores in a first phase, as well as the online channel as the next step,” states Antonio di Vincenzo, President of Imap Export, the company that owns the Original Marines brand. “We felt that the Aptos solution was in line with our needs and our objective to make our processes ever more precise, lean, effective and efficient. Our offering is extremely large; we run an assortment of over 10,000 product options that we sell through a network of nearly 650 stores and our online channel. With Aptos, we aim to achieve the best possible levels of accuracy in budgeting, planning and distribution, reducing inventory levels and maximizing in-season sales.”

“Original Marines is able to combine tradition and innovation with their ‘ethical company’ status and a strong strategic vision,” adds Noel Goggin, CEO and culture leader at Aptos. “We are proud to partner with a brand of this caliber and to accompany their growth and omnichannel journey with our merchandise and assortment planning solutions.”

“We believe that quality and style shouldn’t be a luxury for a few, but a reality for many,” adds di Vincenzo. “To accomplish this objective, we manage internally both the design and the sampling phases, ensuring superior comfort and quality levels in our garments. In terms of distribution, our commitment to customer satisfaction is expressed through the realization of a truly omnichannel sales structure, which allows our customers to buy wherever and whenever they wish.”

Creativity, quality and the Italian spirit are only a few of the assets of Original Marines, which celebrated its 35th anniversary in 2018. This dynamic retailer produces and distributes apparel collections targeted for children 0-12 years old. A mix of colors, poetry and attention to the needs of the children are expressed in each item in an unexpected and extraordinary way. Original Marines has more

than 500 stores in Italy and over 140 stores throughout Europe, Asia and Africa.

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Ramboll chooses O&M Design simulation solution from Shoreline

22 January 2019

Ramboll has chosen to use Shoreline's O&M Design simulation solution as a part of their broader service palette within consultancy services in the area of contractual and technology risk assessments, operational readiness studies, due diligence and OPEX analysis.

The computational performance and level of detail of Shoreline's O&M Design solution bring Ramboll in the position to assess a great variety of different logistical spreads, and optimal risk and cost-informed asset management decision making for their clients.

Senior Engineer Ramboll, Matti Niclas Scheu says: "The Shoreline tools enable us to compute high-resolution availability assessments and support risk assessments of the operational phase of an offshore wind farm, e.g. in the supply chain such as non-availability of jack-up vessels. This has proven of very high value to us. It is important for us to highlight that the cooperation with Shoreline links to a solid set of services that we are offering our clients, from the early development phase to the actual operation of their offshore wind assets. Shoreline's cloud-based simulation solutions secure us the latest versions and updates and make it possible for us to access it globally from anywhere we need it."

Shoreline simulation and optimisation product portfolio comprise an integrated suite of solutions for the entire life cycle of an offshore wind farm from early strategy assessment through construction, and into operation.

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U.S. Air Force Awards Siemens Government Technologies Contract for Teamcenter

17 January 2019

Siemens Government Technologies, Arlington, Virginia, has been awarded a \$24,586,803 indefinite-delivery/indefinite-quantity contract for the reactivation and maintenance of Teamcenter software. This contract provides for the reactivation and maintenance of the Teamcenter software, as well as original equipment manufacturer support for the Air Force. Work will be performed at Hill Air Force Base, Utah, and is expected to be completed by Jan. 17, 2024. This award is the result of a sole-source acquisition. Funding will be obligated on the initial order of the IDIQ contract. Air Force Life Cycle Management Center, Wright-Patterson AFB, Ohio, is the contracting activity.

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Product News

Advanced Solutions Develops New Automation Technology

17 January 2019

Advanced Solutions, Inc., a diversified technology company and an Autodesk Platinum Partner, announces the launch of a specialized automation technology, titled Automate 3D. Automate 3D, produced by Advanced Solutions, allows companies to input customer requested parameters for automatic generation of models and drawings to deliver to end-users, customers, and ERP systems.

Automate 3D utilizes Autodesk's Forge technology in combination with Autodesk AutoCAD and Autodesk Inventor. Advanced Solutions' software development and engineering team partner with businesses to configure Automate 3D according to each company's specific rules and criteria for the generation of custom products. Businesses or their consumers then enter the desired specifications of a product into the simple Automate 3D interface. Upon submitting the information, Automate 3D connects with Autodesk AutoCAD or Autodesk Inventor to automatically and instantly create a 3D model for customer approval or for engineering use such as simulation. Additional output includes 2D drawings and details for production, and bill of materials for purchasing.

Automate 3D gives companies the power to enhance their customer's experience providing customized products without the increased costs typically associated with custom designs. Also, companies using Automate 3D may improve product performance, increase operational efficiency and automation, win more business, increase innovation capacity, and differentiate their brand.

"Automate 3D is one of our most extensive and exciting creations to date. We have taken a complex and expensive sales-to-engineering process and developed a simplified approach that gives consumers the unique ability to make custom designs utilizing AutoCAD-like workflows on the web" said Jason Barnett, Vice President of Manufacturing, Advanced Solutions. "By removing the need for continuous engineering involvement throughout the quoting process, companies are able to offer made-to-order products more efficiently and profitably while automatically creating quality 3D models and detail drawings."

Automate 3D is one of many software applications launching by Advanced Solutions in the next 12 months. With extensive expertise in software development, Advanced Solutions is placing emphasis in 2019 on creating a significant number of new cutting-edge software solutions for the Manufacturing, Architecture, Engineering, and Construction design industries.

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BobCAD-CAM Releases New, In-Depth V31 Lathe Training Video Set

21 January 2019

BobCAD-CAM is very pleased to announce the release of our V31 Lathe Training Professor Video Series. These in-depth videos are designed to maximize your machining capabilities in a timely manner by helping you fully understand all the steps and options of BobCAD's Job Tree, machining features and toolpaths. Tackle advanced programming situations with V31's geometry editing tools, tool library, toolpath constraints, operation stock, grooving cycles & much more!

This complete Lathe Training Professor Video Series includes:

- 178 Easily Navigated Training Videos (DVD)
- A 578-Page Digital Training Manual (PDF)
- Plus, CAD Training Files to Use with Corresponding On-Screen Lessons

Lathe Training Professor will help users learn how to:

- Save Time & Money with Programming Shortcuts
- Create Better Surface Finishes
- Reduce Programming Times
- Avoid Costly Machine & Tool Collisions with Simulation
- Explanation of all new Features and Functions
- Plus Much More!

Whether you are a first-time user or looking to expand your capabilities, this training set will help fast-track users towards creating better parts faster & easier.

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CGTech to Debut VERICUT Composites Applications V8.1.2 Software at JEC

23 January 2019

At the 2019 JEC Composites show, 12-14 March 2019 at the Paris Nord Villepinte Exhibition Centre, CGTech will demonstrate how advanced programming strategies and simulation can lead to better composite parts.

Throughout the show CGTech will also demonstrate Composites V8.1.2, the latest version of VERICUT Composite Programming (VCP) & VERICUT Composite Simulation (VCS).

CGTech's Composites V8.1.2 release of VCP and VCS features a completely redefined Graphical User Interface (GUI), enhanced suite of programming and analysis tools, and redefined methodology through the use of the powerful new Laminate Manager. The Laminate Manager helps users easily manage files, processes, and batch actions for the entire composite laminate. Internal refinements ensure that large projects are now able to be programmed and simulated in a fraction of the previous time.

The aerospace industry continues to push for lighter, faster, and more cost-effective parts. To support these goals, VCP now puts more power into user's hands. With more information available than ever before, part programmers can generate and export part statistics directly from VCP. The addition of the all-new summary reports allows engineers to compare different layup strategies, and feel confident the optimal design prevails. "However, one should not stop at the programming stage," said Tony Shrewsbury, CGTech Managing Director. "Companies now more than ever are realising the importance of simulation and the digital twin model. With VCS users can watch their parts come to life on their machine, leaving them confident that the intended design will match what is manufactured."

CGTech will also exhibit its latest version of VERICUT software. VERICUT 8.2 is an industry leading CNC machine simulation, verification and optimisation software that enables users to eliminate the process of manually proving-out NC programs. VERICUT simulates all types of CNC machining, including drilling and trimming of composite parts, water jet, riveting, robotics, mill/turn and parallel kinematics. VERICUT runs standalone, but can also be integrated with leading CAM systems.

Visit CGTech in Hall 5, Stand Q49 at JEC World 2019.

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Dremel Strengthens Its DigiLab Suite with the 3D40 FLEX 3D Printer

21 January 2019

To continue providing Makers and educators with the best in digital fabrication, Dremel has announced the debut of its newest 3D printer, the Dremel DigiLab 3D40 FLEX 3D Printer.

Designed for a truly seamless 3D printing experience, the 3D40 FLEX offers a variety of new features that make it quick and easy to create a range of prints for the classroom. Most notably, the 3D40 FLEX includes a flexible build plate to help make it much easier to remove parts after printing – one of the biggest challenges with most 3D printers today.

"We've seen a lot of use and success with our previous 3D printer models," Dremel President John Kavanagh said. "As we continue to learn about digital fabrication, it's important to introduce new innovations to better suit the classroom and makerspace settings. This is what led us to 3D40 FLEX."

To accommodate more users, the 3D40 FLEX also prints 30 percent faster in draft mode. This speed setting maximizes time with the printer, ideal for environments that require quick turnaround and continuous run time. The printer also features higher resolution capabilities to better print intricate features like arches, organic forms, small details, engravings and diagonals.

"The Dremel DigiLab 3D40 FLEX 3D Printer will help with complex and practical applications, perfect for educational usage," Kavanagh said. "It's a safe, reliable option for Makers of all ages and skill levels and incorporates a lot of smart design elements to enrich the experience."

Dremel DigiLab 3D40 FLEX 3D Printer Main Features at a Glance:

- Flexible build plate for easy, safe removal of prints
- 30 percent faster printing while in draft mode to maximize the utilization of the machine
- 50 (.05mm) micron resolution to better print more intricate and detailed designs
- Cloud-based printing software to easily maximize printer usage
- UL-certified and rigorously tested to ensure safety
- Ideal for classrooms and makerspaces that accommodate multiple users
- Industry-best customer support that provides immediate assistance for any troubleshooting need

For educators interested in hands-on, project-based learning, Dremel has an education-focused offering featuring both the 3D40 FLEX and the Dremel DigiLab 3D45 3D Printer. In addition to the products, users receive access to a four-hour professional development course and 30 standard lesson plans for

students ranging from third to 12th grade.

The Dremel DigiLab 3D40 FLEX will be available at select retailers and online this February (MSRP \$1,299 USD). For more information about the Dremel DigiLab 3D40 FLEX and the entire DigiLab suite, visit digilab.dremel.com.

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EdgeVerve Systems Launches AssistEdge Discover to Unlock the True Value of Automation

22 January 2019

EdgeVerve Systems, a subsidiary of Infosys, today announced the launch of AssistEdge Discover, a unique tool aimed at increasing the success rate of automation implementations at the enterprise level through process discovery. AssistEdge Discover automates processes sans human bias that often times lead to automation implementation failure.

Over half of enterprise automation implementations still fail when business processes are not properly understood and manual knowledge is relied upon for process execution. At an enterprise level, this becomes increasingly challenging as the amount of data and number of steps in each process increase. By eliminating human bias and reducing manual process discovery, AssistEdge Discover can help an enterprise realize the full value of automation and enable collaboration, effective change management and continuous process improvement.

AssistEdge Discover leverages user key strokes and sophisticated neural network algorithms to create an effective automation blueprint. It provides a clear recommendation based on the understanding of how business processes are executed through four pillars:

- **Automatic Data Capture:** Input such as mouse and key strokes from identified users can be monitored and recorded without interfering with the employee's work.
- **Remote Management of Data Capture:** Administrators decide and control what data is being captured from which machines and users, and at which frequency, to ensure that no business and user sensitive data is captured.
- **Visual Data Analysis and Mapping:** Data enrichment and analysis is carried out using advanced neural network and AI algorithms. This creates a visual, data-rich process map which not only shows common paths, but also different variations of the same path.
- **Recommendations:** Recommendations identify the automation opportunities and collate them into a dashboard, allowing the enterprise to compare different processes and make an informed decision. Automation recommendations are based on real data, thus avoiding manual bias.

AssistEdge Discover simplifies the automation journey for enterprises that are growing at a rapid pace and require speed, agility and insights to drive success. The tool was uniquely built to be platform agnostic and work alongside other RPA tools, enabling an enterprise to better manage processes across multiple systems seamlessly.

Craig Le Clair, Vice President, Principal Analyst Serving Enterprise Architecture Professionals, Forrester, said, "Automation is no longer a back-office activity and now moving to the frontend where data driven insights and process mapping are becoming key to maximize automation success. RPA and

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AI will join forces to create digital workers for more than 40% of enterprises. Broader process assessment is developing quickly. There is a need to advance analytics to attack process improvement and combine process mining data with traditional RPA desktop analytics to create heat maps to guide bot design and bot behavior."

Atul Soneja, Global Head, Edge Products and Infosys Nia, EdgeVerve, said, "Today, with the rise of digital workforce in an enterprise, success is fast becoming outcome driven. The key to automation success is process discovery. The empirical approach to automation through process discovery makes the whole process transparent and amplifies the hidden values of automation impacting ROI. This is where AssistEdge Discover helps realize the true value of automation. It helps enterprises prioritize key processes for automation as well as key technologies to amplify business benefits."

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