

SAE 2015 Augmented and Virtual Reality (AR/VR) Technologies Symposium

Technical Session Schedule

As of 11/11/2015 07:41 pm

Thursday, November 5

ARVR Day One

Session Code: ARVR1

Room Gallery Seminar Suites 1/2/3

Session Time: ALL DAY

Time	Paper No.	Title
8:45 a.m.	ORAL ONLY	<p>Virtual Reality and Industry 4.0: the Digital Twin in Product Design, Manufacturing and Sustainment</p> <p>Industry 4.0 will transform production. Isolated cells will come together in a fully integrated, automated and optimized production flow, paving the way to greater efficiencies and reduced waste, and changing traditional production relationships among manufacturers, suppliers and customers.</p> <p>

</p> <p>The Industry 4.0 vision is creating new paradigms of interaction between humans and machines.</p> <p>

</p> <p>Virtual and augmented reality technology has been waiting for this moment for a long time. Isolated, over-optimized manufacturing processes and, admittedly, organizational culture, have limited the reach of AR/VR technology and its ability to create context-rich environment for effective collaboration and decision-making.</p> <p>

</p> <p>In this keynote, Joe Barkai will describe the concept of a product's digital twin: a digital manifestation of a physical products that encompasses rich multidisciplinary information such as geometry, manufacturing, supply chain, and maintenance.</p> <p>

</p> <p>The digital twin, or cyber-physical modeling, is an expression of the business value of AR/VR technology and its future role in industry 4.0's factory of the future, and, in fact, in the entire span of a product lifecycle.</p> <p>

</p> <p>Joe will also explore the role of Industrial Internet of Things (IIoT) as a technology foundation to enrich the context of AR/VR-based cyber-physical systems to further improve the capacity of manufacturing organizations to make high-fidelity decisions.</p> <p>Joseph Barkai</p>
9:30 a.m.		BREAK
10:00 a.m.	ORAL ONLY	<p>Matching Technology Readiness to Industrial Use-Cases</p> <p>Augmented Reality (AR) is a maturing technology that is able to create a more meaningful and useful work environment for deskless workers in a production environment. As augmented reality evolves, transition success lies in matching valuable use-cases with the readiness of the technology. Recognizing the power of today's AR, as well as its limitations, allows us to provide mobile AR solutions to complex industrial challenges in areas of work where the current state of the technology can provide the most benefit.</p> <p>Mary Claire McLaughlin, Newport News Shipbuilding</p>

10:30 a.m.	ORAL ONLY	<p>Virtual Reality in Virtual Manufacturing</p> <p><i>This presentation will introduce in the implementation of VR in the John Deere design center and production facility at Mannheim. VR understood as an element in the virtual development process. Focus is on collaboration and communication support with visualization. A turn-key solution and a private public partnership with the University of Applied Science Mannheim helps concentrating on process and 3D-data quality for complete vehicles.</i></p> <p><i>Paul Greif, John Deere GmbH & Co. KG</i></p>
11:00 a.m.	ORAL ONLY	<p>Classifying, Assessing and Managing Risk with Enterprise AR Introduction</p> <p><i>The AREA members have studied risk factors frequently anticipated or encountered with enterprise AR deployments. During this session, we will explain the four classes of most common risk: safety, cost, security and technology maturity, and provide recommendations our members have compiled for assessing their relative importance in a business and steps to manage those risks before they impact the introduction of AR.</i></p> <p><i>Christine Perey, AR for Enterprise Alliance</i></p>

11:30 a.m.

ORAL ONLY

Virtual Reality in Industry: Cradles Embarkation Simulation in Manufacturing Submarines

DCNS Group is positioned as prime contractor and integrator for whole warships in naval defense sector. It designs, manufactures and provides through life support for the most innovative surface naval systems and submarines on the market along with the associated critical systems.

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DCNS Group is also positioned as a major actor in marine renewable energies and continues its deployment on the civil nuclear energy and marine energy and infrastructure service markets. The DCNS Group is testing and implementing the tools of Virtual Reality in these processes for more than 15 years.

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Initially, Virtual Reality was used to support the design offices in their design of military vessels. Sales teams used it to live to Customers the experience of their ship before it was built. With the continuous development of hardware and software solutions, new uses are now possible. DCNS takes advantage of these new opportunities to further improve its processes and productivity. Thus, for some time now DCNS has implemented a new process for the construction phase of its submarines. This new use of the digital model in an immersive environment is rethinking how to plan the mounting activities.

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A submarine is designed and manufactured ring by ring (rings named sections). Each ring consists of a pressure hull in which are integrated complete pre-equipped block named cradles. The operations are complex, due to the gigantism of construction and precision to bring to this integration. You should check that the cradle and all the material it contains may enter the section without any interference.

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Any errors or problem encountered during these tasks may affect the physical integrity of the equipment and staff, and can jeopardize the ship planning, always very constrained. Before the introduction of Virtual Reality for this activity, DCNS led his mounting tasks planning studies in a first time with scheduling experts, and then made checks on paper or with specialized software in a second time.

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Today it is the Virtual Reality simulation to guide the industrialization studies. The mounting logic is produced with immersive Virtual Reality simulations in a first time. She is used by the planning team in a second time to determine equipment not to mount on the cradle, to identify tools needs and size of the required scaffoldings, etc. From now, the feasibility guides industrialization in these critical tasks of mounting. The logic is completely inverse and more efficient, rework is less.

Yann Bouju, DCNS Group

1:30 p.m.	ORAL ONLY	<p>Virtual Reality Display Technologies & BEYOND Pixels</p> <p><i>Augmented and Virtual Reality are not necessarily 2 separate worlds, one is not to replace the other, more and more cases appear on the horizon where both worlds and technologies are combined. Display systems like power walls and caves have been around for many years and are still being used in design and engineering critical processes. Improving efficiency, shortening lead time, bringing insight in complex problem solving are still considered to be the main drivers for the use of those well-known virtual reality display systems. In this session an overview will be given on the history of VR display technologies, what is available today and what might be considered as future display technologies. What are the trends related to different use cases, how is this related to the different components to be considered as a buyer or user, and how do other technologies beyond pixels contribute to the value of virtual reality display systems.</i></p> <p><i>Kurt Doornaert, Barco Control Rooms GmbH</i></p>
2:00 p.m.	ORAL ONLY	<p>Cognitive Digitalization: Learning from Reality</p> <p><i>Big data and its analysis is a major factor in the optimization of industrial processes with IT. These systems have proven highly useful by sampling data from machinery and correlating it with failure times or throughput. Predictive maintenance or parameter optimization are key benefits of this fourth industrial revolution, often denoted as Industry 4.0.</i></p> <p><i>A similar approach is also applicable to automatically gather useful information for worker assistance, e.g., using augmented reality. With methods from artificial intelligence and pattern recognition, data from various sources is processed, facilitating discrepancy analysis, the creation of workflow documentation, and general worker support.</i></p> <p><i>The talk presents recent approaches as well as close-to-market solutions with industrial applicability that exploit sensory data beyond the immediate spatial paradigm of augmented reality.</i></p> <p><i>Nils Petersen, DFKI</i></p>
2:30 p.m.	ORAL ONLY	<p>Virtual Reality - Don't Forget We are Human</p> <p><i>As virtual reality and augmented reality are growing in popularity it is important to not forget about the user, Jaguar LandRover always strive to Create experiences customers love for life, this crosses over into the development process where we focus on the user experience not the technology to enhance the designers and engineer immersion experience to enable them to create the vehicle of the future. This presentation will cover how AR VR are being used, how it makes a difference to quality, time, and demonstrate that JLR are committed to continued investment in this area.</i></p> <p><i>Brian Waterfield, Jaguar Land Rover</i></p>
3:00 p.m.		BREAK

3:30 p.m.

Panel

Technical Expert Panel Discussion: Head Mounted Displays (HMD)

As an extension of the Technical Program, this Panel Discussion brings industry experts together to discuss the real-world challenges and utilization opportunities in headset application for design and manufacturing. The goal of this Panel is to enhance the understanding of those participating in the audience on where the current state of the technology is, and to engage in problem solving discussions through the exchange of ideas. Each attendee is encouraged to pose questions, share experiences and explore practical solutions.

Moderators - Paul Robert Davies, Boeing

Panelists - Richard Cashmore, Mechdyne Corporation;
Matthew Kammerait, DAQRI; Robert Forrest, BAE Systems;
Chris Freeman, AMRC with Boeing;
Richard M. Wiles, National Grid;

5:00 p.m.

EXTENDED TWO HOUR NETWORKING RECEPTION

Thursday, November 5, 2015

Hospitality Suites 16 & 18

17:00 & 19:00

Please join us at this complimentary evening reception & where you will have the opportunity to network with leaders in the AR/VR community representing some of the world's largest automotive, aerospace, commercial vehicle, and naval engineering organizations.

Friday, November 6

ARVR Day Two

Session Code: ARVR2

Room Gallery Seminar Suites 1/2/3

Session Time: 08:30

Time

Paper No.

Title

8:30 a.m.

ORAL ONLY

The Value of Immersion for Cross-functional Collaboration

The benefits of immersive virtual reality are generally thought of in terms of efficiencies gained through optimization of the project management triangle ¿ triple constraints¿ of cost, timing and scope. The centerpiece of this triad is quality, which is fundamental to any industrial design discipline.

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Conversely, most virtual reality and some augmented reality have the reputation of being anti-social: a technology created which isolates the user, separating him/her from the rest of the team. Even though massively multiplayer online (MMO) games are collaborative, they are a level removed from reality and most players are alone or in a small group in the physical world.

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But there is high value in being totally immersed in a potential reality, while communicating with a global and cross-functional team in real time. Elizabeth will detail how immersive environments are used to bring global teams together in a holistic, shared manner that is unlike any other type of design or engineering review. She will explain the benefits realized at Ford from global immersive collaborative reviews, especially related to the cultural shift taking place at Ford with respect to how different disciplines can effectively understand each other¿s ideas.

Elizabeth S. Baron, Ford Motor Company

9:00 a.m.

ORAL ONLY

Augmented Reality in Training for Touch Labor Tasks

This presentation will discuss an Augmented Reality training tool, developed by Boeing to facilitate increases in the efficiency of training for touch labor tasks. Previous studies conducted in collaboration with Iowa State University showed that using Augmented Reality to present work instructions showed both (1) a dramatic improvement in the speed of learning new assembly procedures, and (2) an improvement in the build quality of the completed article. To further this work, Boeing Research & Technology is developing a training tool that combines augmented imagery (guiding touch labor tasks) with matching audio cues through a wireless headset to further re-inforce training information and improve the efficiency of the training process.

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This presentation will focus on the technical development of the tool, and will provide use cases of its testing and deployment on production programs.

Paul Robert Davies, Boeing

9:30 a.m.

BREAK

10:00 a.m.	ORAL ONLY	<p>Integrated Process for Optimal Factory Layouts in VR</p> <p><i>Manufacturing process improvements often impact on factory layouts. The resultant redesign of the shop floor is frequently modelled and simulated to identify optimal layouts. This modelling has often been done in discrete event simulation (DES) packages. Traditionally, once optimized layouts have been identified in DES, these are remodeled in 3D CAD systems to allow the facilities to be visualized. However there are disconnects in this process:- there is no easy way of showing the impact of the process on the built environment, or of the built environment on the process. Developments in simulation connectivity and data capture mean that these disconnects are being removed. New software interoperability allows DES models to create 3D virtual environments on the fly which can then be visualized in immersive environments. This, combined with laser scanning techniques, means that legacy environments can be remodeled and quickly remodeled at relatively low cost and in short timescales. In the future, it is hoped that developments in this field could allow augmented visualization of these processes in the real world factory space allowing factory managers and planners to see into their future!</i></p> <p><i>Rab Scott, AMRC with Boeing</i></p>
10:30 a.m.	ORAL ONLY	<p>Introducing New Technologies (i.e. AR and VR) in a Complex Organization</p> <p><i>Corporate IT is often presented as not willing to support AR and VR constraints, mainly due to their belonging to niche areas. This presentation aims at presenting how Airbus IT doesn't respect this, and thus how Airbus IT makes it possible that AR and VR respect agreed IT standards, and use as many standard deployment protocols as possible. In another hand R&T department have to early consider industrial environment by involving IT people in order to anticipate new technologies introduction without slowing down innovation. AR and VR are thus presented as yet another way of leveraging the product DMU (Digital Mock-Up), and even its being completed with 3-D scanning.</i></p> <p><i>Francois Guillaume, Airbus Group; Yvan Gilles Baudin, Airbus France</i></p>
11:00 a.m.	ORAL ONLY	<p>Experiencing Virtual Manufacturing & A Collaborative Product Development</p> <p><i>The aim of the STRIVE (Simulation Tools for Rapid Innovation in Vehicle Engineering) project is to facilitate a 'step change' in UK automotive manufacturing, enhancing product to design to support improvements in manufacturing productivity whilst retaining and improving build quality.</i></p> <p><i>

</i></p> <p><i>The presentation will focus on the benefits of collaborative development by Bentley Motors, innovative SMEs and research and integration expertise through the VEC, University of Liverpool to accelerate the effective deployment of integrated VR technologies within the manufacturing environments.</i></p> <p><i>Ferdinando Milella, Virtual Engineering Centre; Andy Reilly, OPTIS; Senga Shufflebotham, Bentley Motors, Ltd.</i></p>

11:30 a.m.

ORAL ONLY

Tying it All Together & The Digital Tread

This presentation will focus on how virtual and augmented reality flow through the digital thread. Each of our companies will share our lessons learned and business cases in how we deploy both virtual and augmented technologies. We will discuss our experiences in implementing AR technologies to mitigate rework and improve first time quality release. We will also share our lessons learned in implementing virtual modeling technologies to mitigate ergonomics risks, and speed assembly learning on the manufacturing floor. Overall our discussion will emphasize: How to understand the “best fit” technologies for product and process design needs; enable agile and flexible development processes; look for solid leverage points and opportunities for replication across the enterprise and integrate technologies into product life cycle applications for enhanced sustainability.

Lorrie J. Sivich PhD, Boeing Research and Technology