

# The Truth Behind the Additive Manufacturing Supply Chain

## 16th Annual International Wohlers Conference

<b>Date and Time</b>	Thursday, 27 November 2014, 09:30 – 17:00
<b>Location</b>	Portalhaus, Room Frequenz 2, Hall 11, Exhibition Center Frankfurt/Main, Germany
<b>Organizer</b>	DEMAT GmbH
<b>Chairman</b>	Terry Wohlers, Wohlers Associates, Inc.
<b>Conference Language</b>	English
<b>Registration Fee</b>	Full day €300 + VAT (exhibitor), full day €390 + VAT (non-exhibitor), half day €160 + VAT (exhibitor), half day €220 + VAT (non-exhibitor). Fee includes entrance into the conference and exhibition, technical papers, refreshments, and lunch.
<b>More Information</b>	Contact Mrs. Verena Frenkler at 49 69 27 40 03 30, verena.frenkler@demat.com, or fax 49 69 27 40 03 40.

### Conference Overview



The current additive manufacturing (AM) supply chain is not as evolved as it may seem. It is underdeveloped, and in some cases, almost non-existent. This immaturity could present opportunities, but also major challenges for companies hoping to adopt AM for series production. In fact, the demand for quality materials, machines, and certified suppliers could exceed the supply. Another serious consideration is post-processing, such as the removal of support material and heat treatment, which requires special processes and expertise, and can be time-consuming and labor-intensive.

Companies are also questioning whether the necessary design tools and designers are available to drive the use of AM for production applications. Without fresh thinking, better software tools, and the use of automation to reduce labor, companies may find it difficult to justify the use AM for series production. As organizations dig deeper into all that it takes to produce quality parts by AM, they will find that the technology is merely one step in a sequence that can include nearly every process imaginable.

*Attend this event to discover how individuals and organizations around the world will be impacted by the quickly evolving additive manufacturing and 3D printing supply chain.*

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### Session I: Morning

Includes lunch



09:30

#### Welcome

Dr.-Ing. Eberhard Döring, CEO  
DEMAT GmbH (Germany)

Döring is a mechanical engineer with a PhD in plastics processing. He created the EuroMold exhibition concept and has been the CEO of DEMAT and exhibition manager since 1996.



09:45

#### Keynote: Opportunities and Challenges for Future Industrial Production

Mr. Peter Sander, Vice President and Manager, Emerging Technologies & Concepts  
Airbus Operations GmbH Hamburg (Germany)

Sander has 33 years of experience in the aviation industry, with a wide range of responsibilities. He has managed industrial engineering, tool design and production, manufacturing engineering sheet metal production, CRFP production centers, and the German A380 structure assembly. In 2010, he started to build up a new innovation cell in Germany with a single focus on additive layer manufacturing. Today, Sander is one of the European ALM Project leaders and part of the Airbus Group ALM Roadmap team.

**Presentation Summary** Sander will provide an overview of the key factors, enabling materials and processes, and very important details on how to convince others of the new industrial value chain. Also, he will discuss some of the flying and demonstration projects out of a scope of more than 50 ongoing or final additive manufacturing projects, as well as future industrial needs. Airbus is pioneering the development of topology optimized structural metal AM parts—work that is fascinating and as advanced as it gets—so you will not want to miss Sander’s keynote presentation.



10:30

#### The Impact of Recent Developments in AM

Mr. Terry Wohlers, Principal Consultant and President  
Wohlers Associates, Inc. (USA)

Wohlers and his team have provided consulting assistance to 240+ organizations in 24 countries, including America Makes, Airbus, NASA, and many of the largest and most respected organizations and brands in the world. He has authored 400 books, articles, and technical papers and has given 115 keynote presentations on five continents. Wohlers has twice served as a featured speaker at conferences held at the White House. He is a principal author of the *Wohlers Report*, the undisputed industry-leading study on additive manufacturing and 3D printing for 19 consecutive years.

**Presentation Summary** Unprecedented focus and investment in additive manufacturing and 3D printing are creating both concern and opportunity. The providers of machines, materials, and services may not be able to keep pace with demand. Consider the needs of just one large aerospace company and compare them to the metal-based products and services that were delivered over the past year. Wohlers will bring attention to new developments and activities around the world that he believes could impact supply chains, access to AM products and services, and the momentum and growth of the industry.

11:00

## Break and Refreshments



11:30

### Implications of AM on the Supply Chain and Vice Versa

Dr. Olaf Rehme, Project Manager for Additive Manufacturing  
Corporate Technology, Research & Technology Center, Siemens AG (Germany)

Rehme graduated in mechanical engineering from Hamburg University of Technology in 1999 and worked as an executive project manager for the development and deployment of ERP software at Ventas AG in Hamburg. He joined the Institute of Laser and System Technologies at Hamburg University of Technology in 2003, where he received his doctorate on the subject of cellular design for additive manufacturing, and was responsible for the development of AM technologies in collaboration with industrial partners. Rehme joined Siemens's R&D division in Corporate Technology in Berlin in 2008, and is responsible for project management and strategic development in the field of additive manufacturing.

**Presentation Summary** Additive manufacturing has recently earned full-scale attention in the media, and it is believed to be the industry's savior, but can it be used for real acceleration of businesses? What are the key factors in materials, processes, and product design that determine whether or not viable business cases can be made? Also, what future methods should be employed to improve manufacturing processes? Meanwhile, industrial business models set expectations and constraints that any production technology must meet. Rehme will give insights on Siemens' viewpoint and how all of this will impact the supply chain.



12:00

### HP's Digitization Journey in Print Manufacturing: Lessons for 3D Printing

Mr. J. Scott Schiller, Worldwide Director, HP 3D Printing  
Graphics Solutions Business, Hewlett-Packard Company (Spain)

Schiller recently accepted the role of global director of HP's new 3D printing business in Barcelona, Spain. Previously, he founded HP's Inkjet High-speed Production Solutions (IHPS) business. The charter of IHPS is to help commercial print manufacturers transform their businesses using the power of mass customization. Schiller joined HP in 2003 in the Print Technology Platforms labs in San Diego, California. Prior to this, he worked at Honeywell in avionics and at Microsoft.

**Presentation Summary** Schiller spent the past decade in the trenches of driving adoption of new digital technology in an HP startup business, helping print manufacturers transform their businesses with mass customization. The business has proven very successful, but the journey took many unanticipated turns. Schiller will share what he learned from working with high-end digital processes in manufacturing. Also, he will consider the fundamental truths that might apply to additive manufacturing and 3D printing.

12:30

## Buffet Lunch

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### Session II: Afternoon

Includes lunch



13:30

#### The Industrialization of Metal Powders

Mr. John E. Barnes, Director of High Performance Metal Technologies  
CSIRO (Australia)

Barnes oversees R&D and commercialization activities and investments in continuous metal production and additive manufacturing at CSIRO, the national science agency for Australia. The portfolio ranges from metal production technologies and product engineering to manufacturing technologies such as additive manufacturing. The program makes use of the talents of about 100 research scientists and engineers. The vision is for CSIRO's High Performance Metal Technologies to become the world leaders in all aspects of continuous kinetic metal production research and development, as well as in making additive manufacturing more affordable and robust as a manufacturing process.

**Presentation Summary** Current metal powder production is incapable of meeting a year over year double digit increase in powder consumption. The global titanium powder capacity today is only 5,000 tons per year. Gas atomization alone will not meet the supply or cost incentives, so alternative powder sources are required. Just as we select the right grade of material today, we will select the correct grade of powder in the future. Meeting AM metal powder demand will require qualification of many different powder types. Barnes will outline the challenges and solutions to address the anticipated barriers to the industrialization of metal powders for AM.



14:00

#### Current AM Production and Near Term Evolution

Mr. Paolo Gennaro, Additive Manufacturing Sales Director  
AvioAero (Italy)

In 2004, Gennaro was a founding associate and CEO of Protocast, which became AvioProp—one of the first companies qualified for aerospace and biomedical production with AM technology in the world. After AvioProp was acquired by GE, he became responsible for additive manufacturing sales for AvioAero. As a researcher at the Aerospace Department of Polytechnic of Milano, Gennaro worked on projects that focused on special advanced materials and processes. He earned a master's degree in Aerospace Engineering at the same institution.

**Presentation Summary** Users of additive manufacturing are increasingly applying the technology for production applications rather than simple prototypes. This change is driving the supply chain to respond, resulting in the delivery of greater competitiveness, quality, standardization, and innovation. Gennaro will look at how these changes are affecting the supply chain and how AvioAero is working to meet current and future needs. One of the world's most challenging applications is the production of turbine blades made in titanium aluminide (TiAl) for jet engines.



14:30

#### Additive Manufacturing in China

Dr. Xiaoshu Xu, CEO and Technical Director  
Hunan Farsoon High-tech Co., Ltd. (China)

DXu is the founder of Hunan Farsoon High-tech Co., Ltd., and a Chinese American scientist. He is known worldwide for his expertise in the field of laser sintering. He worked as technology director for leading American laser sintering companies, including DTM, 3D Systems, and Solid Concepts. In 1996, Xu received the R&D 100 Award, which is considered the Oscar Prize in American scientific and technological circles.

**Presentation Summary** R&D work in AM in China started as early as 1995, but most early R&D was performed by universities and government-owned research institutes. Until a couple years ago, AM in China was growing slowly. Starting in 2012, along with booming interest in AM technology worldwide, the Chinese government and investors have actively pushed the development of the technology. Several privately owned AM manufacturers, including Farsoon, have formed and are changing the AM marketplace. Meanwhile, more applications of AM have developed in China. Today, China has become one of the most active countries in applying AM technology in aerospace, automotive, consumer electronics, defense, and other industries.

15:00

## Break and Refreshments



15:30

### Printing the Future of Optics

Mr. Richard van de Vrie, President and CEO  
LUXeXcel Group (Netherlands)

Van de Vrie is an industry innovator with over 25 year experience in the lighting industry. He was previously the CEO of Lighting Partner BV and a vice president of Sylvania Lighting and Lighting Science Group. Both are listed on international stock markets. He has held positions in corporate management, business development, brand positioning, and marketing at lighting fixture and light source manufacturing companies. Van de Vrie has built global platforms and developed and launched new innovative products, collections, and global brands. In 2009, he founded the LUXeXcel Group focused on the 3D printing of optics for LED lighting.

**Presentation Summary** Making a lens can be an expensive and time-consuming process. Over the past decade, lighting manufacturers have faced overwhelming challenges in keeping pace with digital LEDs. Custom light distribution by application, project, or a single product has not been affordable. With advances in additive manufacturing, optics engineers can upload their CAD designs and have them 3D printed. Prototypes and production volumes can be received in a few days. The digitization of optics manufacturing is indeed underway, allowing manufacturers to customize the light distribution of every lighting design, which results in energy savings and a reduction in light pollution.



16:00

### The Realities of Direct Metal Printing

Dr. Ing. Jonas Van Vaerenbergh, Operations Manager, Direct Metal Printing  
LayerWise (Belgium)

In 2008, Van Vaerenbergh obtained a PhD degree at the University of Twente (Netherlands) for his research work performed at the KU Leuven. The same year, he co-founded LayerWise NV, which offers additive manufacturing services for the production of metal parts for industrial, medical, and dental applications. As CEO of the company, Van Vaerenbergh mainly focused on the development of machines, materials, and software and led operations for industrial market segments. In a short few years, LayerWise became a leading companies in metal AM due to its unique position of being a technology developer and user. In September 2014, LayerWise was acquired by 3D Systems.

**Presentation Summary** Van Vaerenbergh will discuss materials, technology specifications, machines, and limitations surrounding the direct 3D printing of metal. He will detail the applications and methods of metal 3D printing for series production versus prototyping. Van Vaerenbergh will also underscore the need for implementing process qualification tools and quality standards, and will give his thoughts and ideas for the future.



16:30

### **Business-to-Consumer Supply Chains in 3D Printing**

Mr. Tim Caffrey, Senior Consultant  
Wohlers Associates, Inc. (USA)

Caffrey is a principal author of the *Wohlers Report*, the undisputed industry-leading study on additive manufacturing and 3D printing. He's worked with Wohlers Associates since 2000, and currently is responsible for the execution of consulting projects, speaking, and representing the company. Caffrey's career in additive manufacturing began in 1992 at Boeing's Propulsion Laboratory in Seattle. He also managed AM operations at Plynetics Express, a large service provider. His experience includes over 20 years of technical writing.

**Presentation Summary** Industrial considerations justifiably dominate the current conversation on the AM supply chain. However, the consumer market is a fast-growing segment of the 3D printing industry. Caffrey will describe the developments in a range of consumer supply chains, including 3D printers, materials, digital content, and part-building services. His presentation will discuss novel business approaches in this segment such as crowdfunding, distributed networks, and web-based merchandising.

17:00

### **Final Questions and Closing Comments**