

Syndicated Pulse

Voice of the Industry
Interview with Mr. Ken Vartanian,
VP Marketing, Optomec

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Ken Vartanian

Optomec, headquartered in Albuquerque, New Mexico, is one of the leading global suppliers of production grade additive manufacturing systems for 3D printed metals and printed electronics. In this voice of the industry interview, Syndicated Pulse is esteemed to feature Optomec, which is breaking new ground in the world of additive manufacturing with its unique 3D printing technology. Thanks to Mr. Ken Vartanian who agreed to share his views on the state of the additive manufacturing industry as well as highlight the opportunities that lie ahead for vendors and Optomec in this space.

Ken Vartanian joined Optomec in 2006 and is the Vice President of Marketing. He has a proven track record as a senior manager in engineering, sales, and marketing roles in

the high-tech industry. He was a co-founder of Rosetta Technologies, a company that developed 3D visualization and digital mock-up software and prior to that held positions at Honeywell and Computervision. Ken holds a BS in Engineering and an MBA.

Syndicated Pulse (SP): Can you share with our readers a brief insight into Optomec’s history and the reason for its formation?

Optomec: Optomec has been in business, since 1983, well before the onset of the additive manufacturing (AM) market. In late 1997, Optomec licensed AM technology from Sandia National Laboratories. That technology is called Laser Engineered Net Shaping (LENS®), and is used to add metallic materials to existing parts or to fully print new parts using high value-engineering metals such as titanium, stainless steel and so on. That’s how we got our foot into the AM market, i.e. with the LENS technology.

Shortly thereafter, Optomec engaged in a DARPA initiative to look at how printing can be applied to electronics. Historically, printing of electronics was performed using traditional graphic methods, such as screen printing, ink jetting, and so on. Although these methods worked well for certain applications, they were limited in terms of the materials they could print and could only print on planar substrates. So DARPA wanted a new printing technology that could handle a wide variety of conductive inks and pastes needed to make electronic devices. Also, DARPA wanted the new technology to print conformal electronics onto 3 dimensional structures. Optomec was very fortunate to receive a 9 million dollar contract from DARPA back in the late 90s to develop this new printing method, which we call Aerosol Jet® technology. Now Optomec has two AM technologies: LENS for printing structural metals and Aerosol Jet for printing electronics. Our vision has always been to print functional materials used to manufacture real end-use products rather than plastics models used for visual prototypes. From the outset, Optomec has focused on applying AM across the entire product life cycle not only for

rapid functional prototyping, but also for manufacturing end products, and the repair/re-manufacturing of in-service products.

SP: Excellent! So with that being said, what do you see are some of the emerging or growing opportunities within these spaces?

Optomec: That is a great question. Optomec AM technology enables our customers to not only print full 3-dimensional parts, but also to add materials onto existing 3-dimensional parts that were produced using conventional manufacturing methods, such as CNC machining or injection molding. This is a very important difference from most 3D printing technologies. Our philosophy is that 3D printing will not replace conventional manufacturing as we know it today, but rather, will be used in combination with conventional manufacturing where each method can produce value for our customers. So in essence, conventional and additive manufacturing are complementary methods. As an example, injection molding is a high-volume, low cost method to produce plastic products. Today 3D printers can't compete with injection molding to produce these plastic parts. On the other hand, using conventional methods such as plating to add electronics to these 3D plastic parts is difficult and environmentally unfriendly. So today it's possible to use conventional injection molding methods to make the plastic portion of a product and then use AM methods to add electronics, such as sensors and antennas to complete the end product. In another example, thin wall metal structures are difficult to manufacture using conventional CNC machining or casting methods, however, these features can be produced using AM methods. So using 3D printing to add metallic material onto metal parts to create difficult to machine features makes sense and is complementary to conventional CNC metal working methods. In our view, finding applications, where Optomec solutions can add value to existing products, is the sweet spot of AM today.

Optomec customers are using LENS metal AM systems today to add wear-resistant coatings to parts to extend their useful life or to repair manufacturing defects to improve process yield, or to repair/re-manufacture in-service parts that might be difficult to restore using conventional welding methods. On the electronic side, again Optomec looks at current manufacturing processes where we can add value and lower costs. As an example, billions of cell phones/smart phones are produced every year, each of which has multiple antennas (WiFi, Bluetooth, NFC, etc). Today, the conventional method to manufacture antennas requires environmentally unfriendly plating and use of hazardous materials such as Nickel. With Optomec Aerosol Jet technology, our customers are able to print functional antennas directly onto injection molded 3D parts using conductive inks eliminating the need for environmentally unfriendly plating processes and the use of hazardous materials. And equally important, the Aerosol Jet process reduces manufacturing cost by 20% for our customers compared to the conventional method. Today, Optomec customers are using Aerosol Jet systems 24x7 for high volume production of sensors and antennas for mobile devices. Each Aerosol Jet system has a capacity of manufacturing around 2 million units a year.

SP: Ok. What are some of the technology trends that are shaping the industry?

Optomec: I think this whole notion of combining additive and subtractive methods into a “hybrid manufacturing process” is starting to take hold because it lowers the risk of adopting new technology and allows manufacturers to leverage existing assets. Making additive manufacturing work in harmony with conventional methods requires an “open systems” approach, allowing each process to work together in the production line or even in one machine.

For example, last May Optomec unveiled a vintage CNC milling machine that was upgraded to include LENS AM technology. So now in one machine, a customer can perform additive and subtractive operations on a metal part with one set-up. The new capabilities offered in this hybrid machine provide an evolutionary approach for industry to realize the benefits of metal additive manufacturing solutions. The LENS Print Engine will provide a low cost entry point for 3D printing of metals because it leverages the widely available installed base of conventional machine tools enabling additive manufacturing to co-exist with subtractive manufacturing methods. These benefits should speed industry adoption of metal additive manufacturing.

SP: Very interesting. Having said that, how does Optomec approach technology, innovation and product development within the company?

Optomec: Optomec is customer driven. We have over 200 customers representing a broad set of industries. We listen to them very carefully to understand their current manufacturing challenges and how AM can improve their business. Often we begin new customer engagements by producing proof of concept parts that show functional capabilities and potential cost savings. Sometimes an individual customer challenge turns out to be a common industry challenge and results in a significant market opportunity for Optomec.AM solutions.

SP: What would you like your customer and clients to know about Optomec’s product offerings? Do you also offer services?

Optomec: Yes we do - Optomec offers services. The services that we offer are primarily focused on developing volume production processes for specific customer applications and supporting customer installations. Also, customers can utilize Optomec certified Service Centers who provide on-demand AM services utilizing our equipment.

SP: Just to understand, what would be the price range of some of your products?

Optomec: Aerosol Jet systems for printing electronics start at about \$200,000, and LENS systems for printing structural metals start at \$300,000.

SP: In terms of markets and demographics, where are you finding the most uptake for your printers and what markets do you consider as a key for both present and future growth of the organization?

Optomec: I think on the electronics side, a real important driver for us is the Internet of Things (IoT). In order for IoT devices to be smart they require sensors and in order for them to be connected, they require antennas. Sensors are required to measure the surroundings and health of the device while antennas are required to communicate their status to the outside world over the Internet. So the ability to print conformal electronics onto metal and plastic parts to give them intelligence is a very important element of the IoT and a driver for our Aerosol Jet business.

Industrial products are also becoming smart and connected providing feedback to engineers to improve future designs and to service technicians to proactively maintain products based on their condition. The life cycle cost of industrial products can be 10 to 15 times higher than the original equipment purchase cost. Smart, connected industrial products offer original equipment manufacturers and their customers' significant potential for cost savings. Although we can't divulge customer names at this time, structural health monitoring is a large opportunity for Optomec requiring conformal sensors that can monitor system integrity in-situ.

On the 3D metal side, we see significant interest in hybrid manufacturing. There are millions of CNC machine tools in use today. We think that at least 10% of these CNC machines at some point will have additive manufacturing capability. So this represents an enormous opportunity for Optomec.

SP: Interesting. When it comes to additive manufacturing, and when you talk to other companies, they view subtractive manufacturing as a technology that competes with additive manufacturing?

Optomec: I hear that all the time. Maybe in the far distant future that dream will come true, and everything will be 3D printed and factories will disappear so people will be able to buy products on Amazon, and those products will be printed on demand - cell phones or cars or whatever. I think that this is a dream. The evolution to this dream will require baby steps, the first of which in our view is the co-existence of additive and subtractive manufacturing. The manufacturing industry is very conservative.

SP: That brings me to another question. Do you think that desktop 3D printing is a fad?

Optomec: Our focus is very much on the industrial side. We do offer industrial bench top printers. For both LENS and Aerosol Jet technologies, we have a model that has a small build envelope that is perfect for the education market. I think that the desktop notion is much more appropriate for the home user or the hobbyist. I don't see, at least in the near future, home users adopting metal printers with high power lasers. For printing electronics, there are a few desktop printers that are very in-expensive and are definitely not industrial strength.

SP: What have been your biggest challenges so far and how have you realigned your strategies to overcome them?

Optomec: I think that our biggest challenge has really been leading the way towards producing real functional end-use devices with additive manufacturing technology. I think that companies like Stratasys and 3D Systems have done a great job in terms of driving the market's imagination about what's possible with 3D printing, primarily with plastics. A few years ago GE acquired Morris Technologies, which is a service bureau that had expertise in metal 3D printing. GE brought them in-house and used their expertise/process knowledge to develop a fuel nozzle for their new LEAP engine. This acquisition really served to legitimize AM for real end product use and helped motivate other manufacturing companies to invest in the technology. Sometimes entrepreneurs have to wait for the market to catch up and sometimes they can be too late, either of which can be disastrous, but Optomec had the staying power to see this through and we think we are now in the right place at the right time with the right products.

SP: Would you highlight any specific partnership or alliance made in the past year or what can we expect on this front from Optomec going forward?

Optomec: We do have some activities in the works, which again I can't talk about at the moment, but stay tuned, there are some interesting developments coming up.

SP: The AM market has essentially been dealing with a lot of consolidation over the past few years. Do you see any potential to be acquired or acquire any companies in the market place?

Optomec: We have certainly seen very aggressive postures by Stratasys and 3D Systems acquiring companies in the 3D printing value chain. At the moment, Optomec is focused on organic growth, ramping-up production and growing our distribution channels. Some of the high-volume production applications discussed earlier represent market potentials for 1000s of Optomec AM machines. So the industrial use of AM really provides the opportunity for us to scale up rather quickly. I think last year we reported 80% growth and through the first half of this year we reported over 100% revenue growth so we are very pleased with the market's acceptance of our strategy. I can't comment about acquisition. All I can say is Optomec is focused on making our customers successful, which ultimately will drive the success of our company.

SP: What do you think of the market conditions in 2015?

Optomec: We are very optimistic that our open system approach and focus on customer success will continue to pay dividends in 2015.

SP: Now in terms of competition who would you consider as your key competitors?

Optomec: Resistance to change. We are competing against traditional manufacturing methods and that's why the notion of open systems and additive manufacturing co-existing with conventional manufacturing is so important. We look for areas within the existing manufacturing process where Optomec solutions can provide value over an

existing point solution. And that value starts with cost savings. Of course there can be other benefits too such as less environmental impact and elimination of hazardous materials – but saving cost is the key.

SP: As a conclusion, what role can we expect Optomec to play in shaping the future of the market or what does the future hold for your company more specifically?

Optomec: Optomec will continue to focus on production grade additive manufacturing for producing real end-use products. We believe we have the right products and services to bring full additive manufacturing solutions to industry today. Our customers are currently using Optomec solutions 24x7 to manufacture millions of consumer electronics devices and to enhance their current industrial products to improve performance and make them smart and connected. We see a bright future for additive manufacturing and will continue to develop innovative solutions to help drive customer success.