OPTOMEC®

PRODUCTION GRADE 3D PRINTING

Optomec is enabling new dimensions in 3D printing. Our solutions provide production grade/production scale printing of fully functional end-use devices and support a wide variety of low cost, commercially available materials used for structural metal and electronic printing applications. Optomec systems also enable the widest range of printed feature sizes, including support for very large meter-scale metallic structures down to very small 10 micron fine feature electronic circuitry. In addition to printing full 3D structures Optomec systems can print in 3D space, enabling material to be added to existing components. With Optomec, high-volume additive manufacturing is a reality today, transforming how companies design, build and maintain critical parts and products.

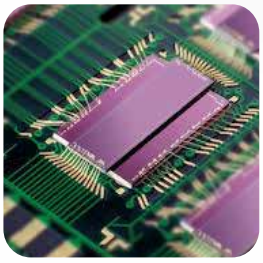
"To reduce manufacturing cost and meet high consumer demand, display substrate sizes are increasing which directly increases the number of defects per panel. We selected the Aerosol Jet Print Engine because of its unique fine line printing capability that enables our customers to increase production yields and improve repair quality at a lower repair cost/unit."

- Mr. Kenji Kuga, General Manager, Micronics Japan Corp.

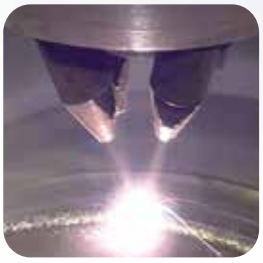
"Our market research brought us to the conclusion that Optomec is the market leader offering the most mature technology and the best technical and maintenance support. The proven capability to process titanium to aerospace industry standards was also a strong recommendation. The professionalism and openness of the sales staff inspired confidence in Optomec as a company and partner."

- Herman Burger, Council of Scientific and Industrial Research

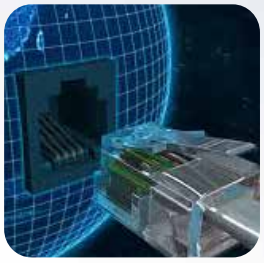
3D Printed Antennas and Sensors



Semiconductor Packaging and PCB



Printed Metals



Internet of Things

Optomec uses proprietary, patented technology to address the unique requirements of high-value application areas such as:

- Printed electronics for consumer products including 3D printed antennas and sensors
- Metal parts development & repair for military and aerospace
- Challenging design elements & requirements for medical devices
- Emerging applications in health, energy and the Industrial Internet of Things

High volume, production scale additive manufacturing solutions that uniquely enable our customers to:

- Print structural metals onto damaged metal parts to restore or enhance useful life.
- Print electronic sensors, antennas and circuitry onto plastic parts to give them intelligence.
- Process a variety of low cost, commercially available functional materials to reduce production costs.
- Integrate Optomec printing technology into current processes or machine tools to leverage current assets and speed implementation.

GLOBAL CUSTOMERS

Optomec introduced its first commercial additive manufacturing system in 1997 and has now installed systems at 200 customer sites in 15 countries. The company has invested more than $30 million in development, which has enabled it to bring to market unique capabilities never before possible in the 3D printing industry. Our worldwide customer base includes industry leaders in many areas of production and research in the area of additive manufacturing.

GE, BOSCH, U.S. ARMY, xerox, Fraunhofer, United Technologies Research Center, U.S. AIR FORCE

OPTOMEC®

Production Grade 3D Printers... with a Material Difference

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3D Printers for the Most Demanding Manufacturing Challenges

Optomec offers two families of 3D printers for additive manufacturing:

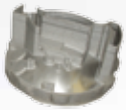
AEROSOL JET PRINTERS FOR FUNCTIONAL ELECTRONICS

Aerosol Jet printers use proprietary technology to enable printing of micron-scale electronics in high volume and in a variety of use models, including printing circuits or components onto 2D or 3D surfaces. Our printers have been proven to meet the functionality, volume and cost demands of the Consumer Electronics Industry, particularly in mobile device and the emerging world of the Internet of Things (IoT).

Aerosol Jet systems are capable of depositing a wide variety of commercially available electronic materials to produce high-resolution circuitry and functional components. Its unique aerodynamic focusing capability can precisely deposit electronic and other materials in dimensions ranging from 10 micrometers (micron) up to centimeter wide. The systems can deposit materials directly onto 3D surfaces enabling printed electronics devices such as conformal antennas, sensors, passives and active components, and interconnects within 3D IC and PCB applications.

Aerosol Jet technology is available either in turnkey system configurations or as a modular print engine that can be integrated into automation platforms for high volume production applications.

LENS 3D PRINTERS FOR METAL COMPONENTS



LENS 3D printers use proprietary laser processing technology to print a wide range of structural metals with new levels of geometric flexibility and mechanical performance. These printers are widely used for repair, rework and coating of complex metal components in military, aerospace and general industrial markets, and well as for the production of large-scale metal components for rapid prototyping and low-volume production, thus reducing overall product life cycle costs.

LENS systems use commercially available powders to print high performance metals in materials including titanium, stainless steel and Inconel, with the quality required for critical applications. LENS 3D printers use the geometric information contained in a Computer-Aided Design (CAD) solid model to automatically drive the LENS process as it builds up a component layer by layer. Additional software and closed-loop process controls ensure the geometric and mechanical integrity of the completed part. L

LENS 3D printing technology is available either in turnkey system configurations or as a modular print engine that can be integrated into CNC machine tools for cost effective production applications.

"LENS has already proven itself as a powerful tool for use in repair and refurbishment applications. We intend to build upon this success to create solutions that will provide the means to both accelerate and validate these processes, and will, together with our Machining Applications Lab, develop hybrid machining techniques that explore how currently insular processes may be combined to provide cost, quality and time benefits."

- Dr. Tom Maloney, Director of Technology, Connecticut Center for Advanced Technology

"The ability to fabricate functional electronics into complex-shaped structures using additive manufacturing can allow Unmanned Air Vehicles to be built more quickly, with more customization, potentially closer to the field where they're needed. All these benefits can lead to efficient, cost-effective fielded vehicles."

- David Kordonowy, , Leader Aerostructures Research Group, Aurora Flight Sciences.

All of Optomec systems are backed by world class customer support and service to keep your 3D printing process operating at full performance, maximizing your productivity and return on investment. To address specific customer needs, we offer a comprehensive set of service assets and support tools, both on-line and on-site.

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