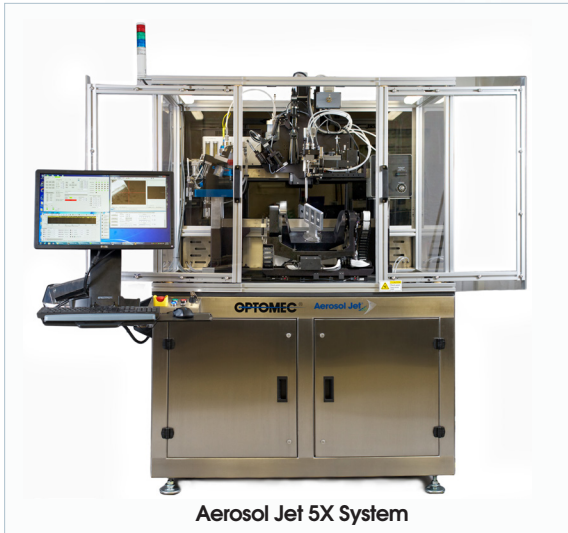


AEROSOL JET® 5X SYSTEM

For 3D Printed Electronics Applications

The Aerosol Jet 5X System has been developed specifically for 3D printed electronics applications such as fully printed antennas, sensors, and MID's.



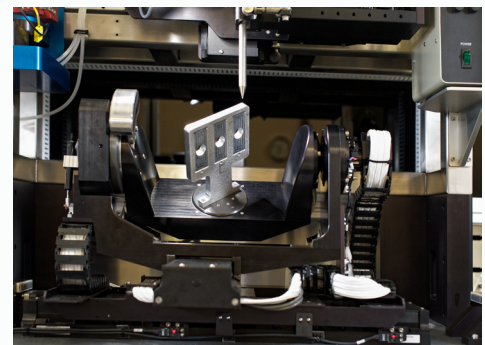
Aerosol Jet 5X System

Driven by manufacturing requirements for flexibility and reduced product cost, the system enables multi-axis deposition capabilities facilitating R&D, rapid prototyping and low volume production needs.

Aerosol Jet 5X is a modular solution. It comes standard with Sprint direct write technology which is geared specifically for printed material evaluation, prototyping, and product development. Optionally, a Marathon print module, Optomec's production grade printing technology, can be added to the system which enables low volume production runs. Automation platforms configured with multiple Marathon print modules are also available for high volume production needs.

Aerosol Jet supports a wide variety of functional materials, including conductive inks, dielectrics, polymers, adhesives, etc., which can be deposited onto planar and non-planar substrates.

The System includes Sprint interchangeable fine and wide feature print heads capable of printing features from 10 microns to one millimeter. The system has 5-axes of motion with a print envelope of 200mm x 300mm x 200mm (x, y, z).



5 Axes of coordinated Print Motion

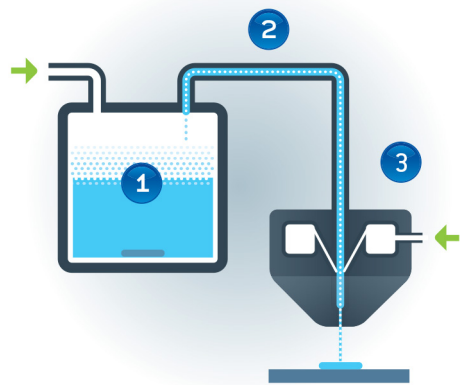
FEATURES

- ▶ Features sizes ranging from ~10 microns to one millimeter
- ▶ Dispensing support for wide variety of inks / materials
- ▶ Repeatable recipe driven dispense
- ▶ 3D Capabilities
- ▶ CAD import eases toolpath generation
- ▶ R&D to low-volume flexibility

APPLICATIONS

- ▶ 3D Antenna for Smartphones and Notepads
- ▶ Complex Molded Interconnect Devices (MIDs)
- ▶ Embedded Sensors
- ▶ Cost Effective Low Volume Manufacturing

Aerosol Jet Process



How the Aerosol Jet Process Works:

- 1 A liquid sample is atomized, creating a dense aerosol composed of droplets with diameters between approximately 1 and 5 microns.
- 2 The aerosol is transported to the deposition head using an inert carrier gas. [In-flight aerosol heating is optional].
- 3 The aerosol is focused within the deposition head by an annular sheath gas. The resulting high-velocity jet is deposited onto planar and 3D substrates, creating features ranging from 10 microns to one millimeter in size.

Features

Aerosol Jet 5X System Specifications

Minimum line width	10 um at 20 um pitch (material and surface dependent)
Single Pass Layer Thickness	100 nanometers to 2+ um
Ink Viscosity Range	
Sprint Ultrasonic Atomizer	1 to 5 cP
Sprint Pneumatic Atomizer	1 to 1000 cP
Optional Product: Marathon Print Module	50-200cP
Droplet size	1-5 um Ø
Stand-off height	Up to 5mm (nozzle tip to substrate surface)
Work Area	200mm x 300mm x 200mm (x, y, z)
Motion Accuracy	X, Y, Z Axes per stage ±10µm (100mm range)
Motion Repeatability	+ 10 microns per X, Y, Z Axes
Rotational and Pivot Axes:	
Rotational position accuracy	80 arc sec
Rotational repeatability	03 arc sec
Pivot axis position accuracy	80 arc sec
Pivot axis repeatability	03 arc sec
System dimensions	1020mm x 1375mm x 2240 mm (Does not include dimensions for ErgoArm and monitor)
Stand alone system weight	~835 kg
Electrical	110/220V, 50 or 60Hz, 40 Amps (10 Amp at continuous operation, typical)
Utilities Gas	28 LPM Nitrogen Gas

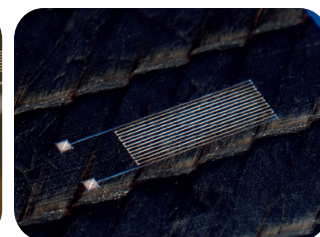
Aerosol Jet Printing Examples



Smart Phone Main Antenna



Phased Array Antenna



Strain Gauge on Aluminum Structure
Courtesy: Fraunhofer IFAM

ABOUT OPTOMECH

Optomec is the world leading provider of additive manufacturing systems for high-performance application in the Electronics, Biomedical, Photovoltaic, and Aerospace & Defense markets. These systems utilize Optomec's patented Aerosol Jet Printed Electronics technology and LENS power-metal fabrication technology.