



SNS College of Technology

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COIMBATORE-641 035, TAMIL NADU



Department of Aerospace Engineering

19AST202 AIRCRAFT PRODUCTION TECHNOLOGY

ADDITIVE MANUFACTURING IN AEROSPACE

THE SEVEN AM PROCESS CATEGORIES

All seven AM process technologies are based on slicing a CAD geometric model of a part into layers and forming each layer on top of a previous layer until the full physical geometry has been built. What distinguishes each of the seven technologies is their combinations of starting material type (e.g., polymer, metal), physical form of the material (e.g., liquid, powder), layer formation technique (e.g., laser, extrusion), and scanning mode (moving spot, moving line). The seven categories are (1) vat polymerization, (2) powder bed fusion, (3) binder jetting, (4) material jetting, (5) material extrusion, (6) directed energy deposition, and (7) sheet lamination.² Table summarizes some of the features of the seven process technologies. RP/AM machines are commercially available in each of these seven categories in sizes and sophistication levels ranging from desk top printers that can be used in an office environment for several hundred dollars to industrial-grade machines costing thousands of dollars.

Table The seven RP/AM process categories.

Process Category	Process Example	Typical Materials	Physical Form	Layer Formation	Scanning Mode
Vat Polymerization	SL	UV Photopolymer	Liquid	Laser	Moving Spot
	MPSL	UV Photopolymer	Liquid	UV	Area
Powder Bed Fusion (PBF)	SLS	Polymers, Metals, Ceramics, Sand	Powder	Laser	Moving Spot
Binder Jetting	3DP	Plastics, Metals, Ceramics, Sand	Powder	Binder Inkjet	Moving Line
Material Jetting	MJM	Photopolymer	Droplets	Inkjet + UV	Moving Line
	Polyjet™	Photopolymer	Droplets	Laser	Moving Spot
Material Extrusion	FDM	Thermoplastic	Filament	Extruder	Moving Spot
Directed Energy Deposition (DED)	LMD	Metals, Ceramics, Plastics	Powder, Wire	Laser	Moving Spot
Sheet Lamination	LOM	Adhesive-backed Paper, Plastic	Sheet	Laser, Knife	Moving Spot
	SDL	Plain Paper, Plastic	Sheet	Inkjet, Laser, Knife	Moving Line, Moving Spot

Key: SL = Stereolithography, MPSL = Mask Projection Stereolithography, UV = Ultra-Violet light source, SLS = Selective Laser Sintering, 3DP = Three-Dimensional Printing, MJM = Multi-Jet Modeling, LMD = Laser Metal Deposition, LOM = Laminated-Object Manufacturing, SDL = Selective Deposition Lamination.