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Welcome

# How 3D Printing Makes Lean Manufacturing Leaner

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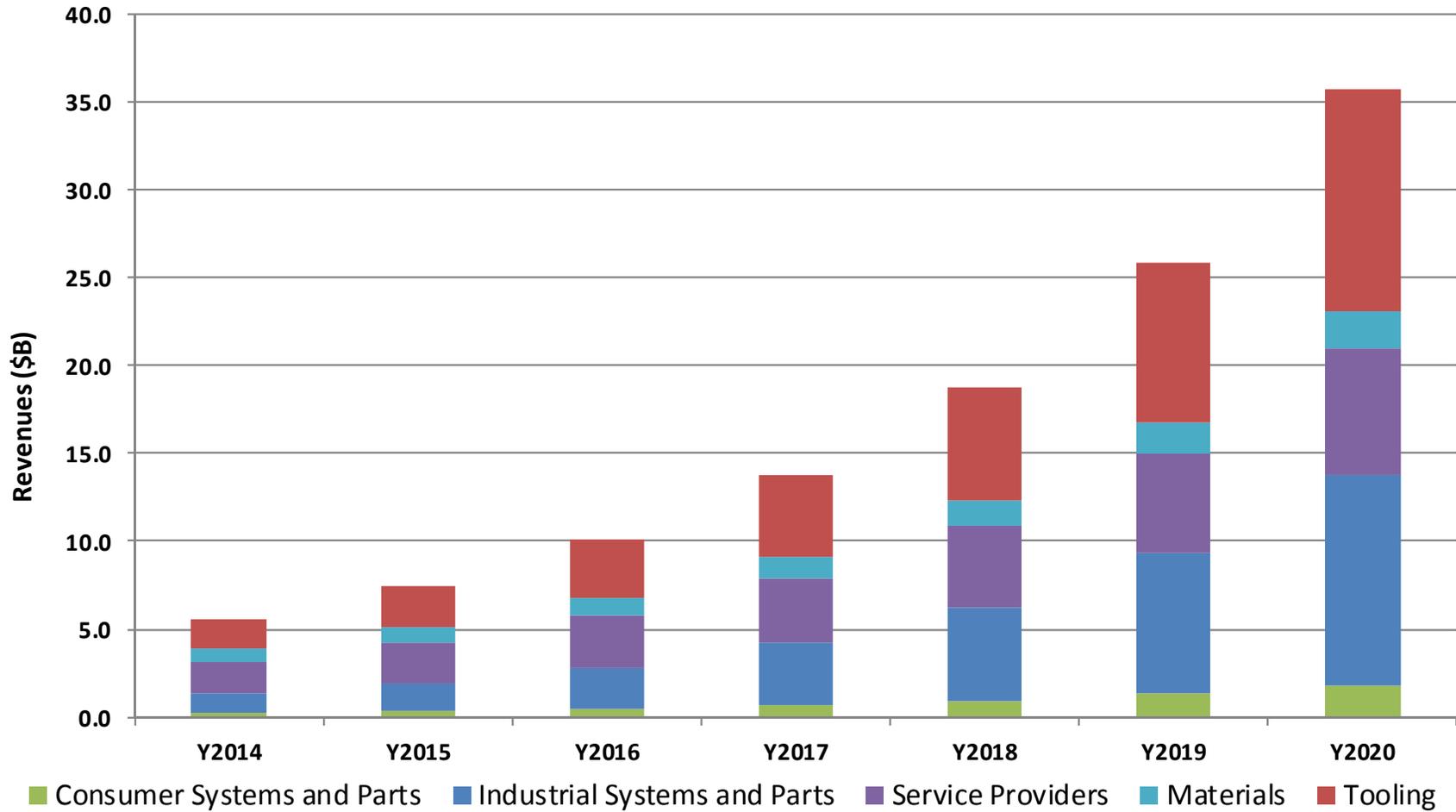
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# How 3D Printing Makes Lean Manufacturing Leaner

# Market Data: 3D Printing Industry Growth Projections

## Revenue Forecast for the 3D Printing Industry from 2014 to 2020



Source: IHS Technology November 2014

# 3D Printing Technology

## A Transformative Manufacturing Process

Although the technology has existed since the 1980s, 3D Printing has really gone mainstream in the last five years. Some industries that the technology has penetrated include:

- Consumer Products: Clothing, Shoes, Jewelry, Toys, Home Décor, Electronics
- Medical Products: Joint Replacements, Prosthetics, Crowns / Invisalign Braces
- Industrial Products: Tools, Molds, Fuel Injection Nozzles, Gas Turbine Parts, Pumps

### What benefits and drawbacks does 3D Printing technology have compared to traditional manufacturing techniques?



3D Printing, also called Additive Manufacturing, “adds” materials to create products, rather than “subtracting” them as is typical in traditional manufacturing processes. This presents significant potential cost savings to manufacturers that invest in the technology.

Products are designed using complex computer software platforms and are then printed layer by layer, allowing for features that were not possible with traditional machine or human manufacturing techniques.

Currently, the biggest drawbacks for 3D Printing are size and speed limitations, which prevent the technology from replacing many assembly line manufacturing processes.

## 3D Printing vs. Machine Tooling and Plastics Injection Molding

PART/TOOL	Customer	3D Printing Technology		Alternative Method
End of arm robot	Thogus	FDM	\$600/ 24 hours	\$10,000/4 weeks
Automated turntable	Thogus	FDM	\$8,800/ 2 weeks	\$50,000/8 weeks
Steel plates	Thogus	FDM	\$20/ 2 hours	\$200/2 weeks
Injection mold	Seuffer	PolyJet	\$1,350/day	\$54,000/8 weeks 500 kg metal

*Above: Comparison of additive and conventional manufacturing resources for tool production. Source: Stratasy*

## Cool Gear, Inc. Uses Rapid Prototyping to Provide Quick Turnaround for Customers



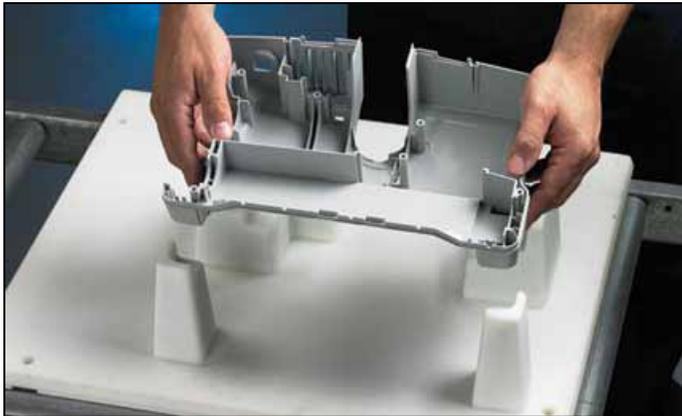
## FDM Reduces the Time and Cost Required to Develop Unmanned Aerial Vehicle



## RedDOT Speeds Production With FDM Nylon 12 Prototypes and Fixtures



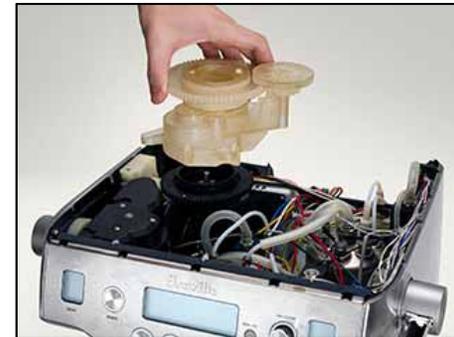
## Direct Digital Manufacturing Reduces Fixturing Costs for Oreck By Up To 65 Percent



## Additive Manufacturing Reduces Tooling Cost & Lead Time to Produce Composite Aerospace Parts



## Gaining Competitive Advantage with 3D Printing



## Manufacturing Jigs and Fixtures with FDM



## Acist Medical Systems



**Thank you**



**Engineering360**