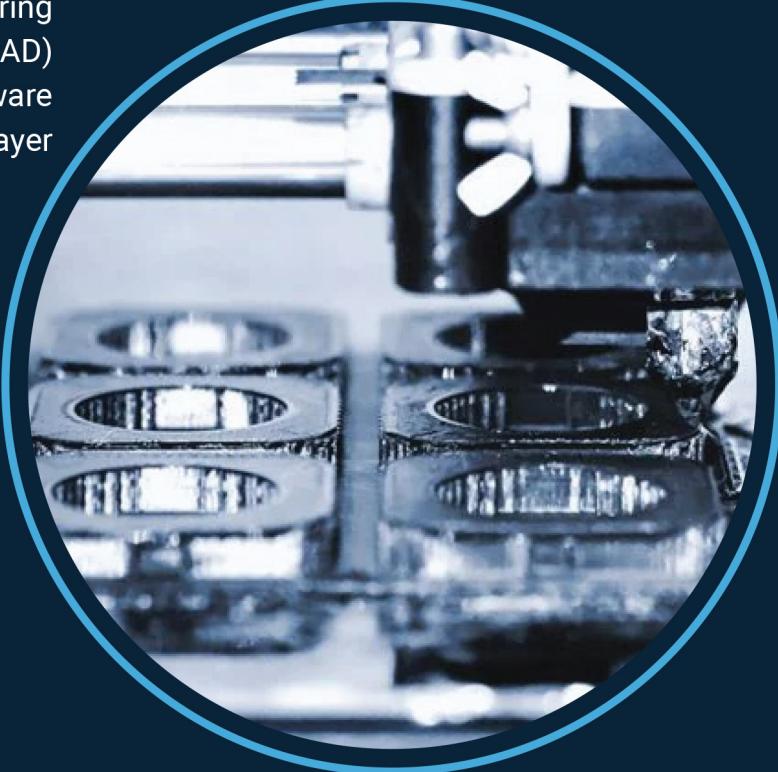


# ADDITIVE MANUFACTURING

Additive manufacturing (AM) is the digital revolution of industrial production that embraces innovation in digital processes, communications, imaging, architecture and engineering to provide digital flexibility and efficiency to manufacturing operations. The computer-aided-design (CAD) software data is used directly to the hardware under this technology to deposit material layer upon layer in precise geometric shapes.

## LIMITATIONS OF TRADITIONAL MANUFACTURING

- Limited Design Flexibility
- Inability by Manufacturers to Hire Skilled Workers
- Inability to Effectively Respond to Supply Chain Disruption
- 20% of Every Dollar in Manufacturing is Wasted (10% of Global GDP)



Aerospace



Automotive



Consumer Packaged Goods



Education and Research



Electronics Manufacturing



Energy



Federal and Defense



Industrial Equipment



Medical



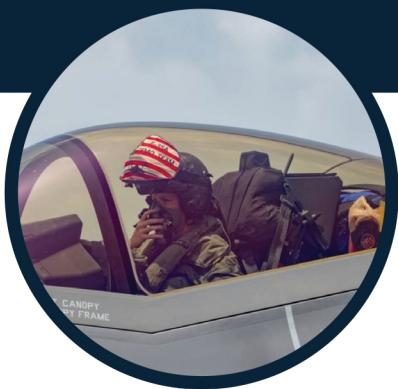
Product Development

## Aerospace

**MRO has the easiest way to manufacture advanced composite and metal parts.**

The Digital Forge integrates with MRO's 3D printers, giving modern manufacturers the simplest way to build with materials they already know. Fabricate end-use carbon fiber composites unattended, overnight. Skip multi-week lead times and expedite fees for metal and composite prototypes, tools, and fixtures.

The MRO 3D printer can reinforce continuous Carbon Fiber, bringing composite strength to an aerospace ready material. Traceable, flight-ready Nylon-Composite FR-A and Carbon Fiber FR-A provide another flame retardant printing solution.



### MRO's 3D Printers: Why Should You Invest In Them?

- Carbon fiber composite solutions, low overhead and facilities requirements,
- Cost of ownership are achieved through secure cloud infrastructure.
- Surface finish that is cabin-quality without additional post-processing, ready for decorative finishes (plating, veneer, paint)
- NCAMP qualifications are being conducted for flame-resistant
- composite printing materials Nylon-Composite FR-A & carbon fiber FR-A.

### A Broad Range Of High-value Aerospace Applications:

- Lightweight cabin components
- Brackets, harnesses, and sensor mounts
- Precision inspection tools
- Workholding
- Functional prototypes

## Automotive

### Drive efficient from Tier 3 suppliers to OEMs

The automotive industry has been looking for a solution to increase the speed at which it produces parts and parts that are both cost effective and high quality. This is where MRO comes in. We believe that 3D printing will play an important role in the future of manufacturing, improving efficiency at every stage of the vehicle life-cycle from Tier 3 suppliers to OEMs.

3D printing technology offered by MRO makes it easy for engineers to design prototypes quickly, simulate their designs and optimize them for production with no time spent on manual entry or CAD modeling.



### MRO's 3D Printers: Why Should You Invest In Them?

- Print composites, continuous fibers, and metals on a single platform
- Continuous fiber reinforced parts deliver near-metal strength with the ease of plastic 3D printing

### A Broad Range Of High-value Automotive Applications:

- Durable, complex assembly jigs
- Lightweight grippers/ end-of-arm-tooling
- High-strength brackets and sensor mounts
- Welding hardware: fixtures, shanks, splatter guards
- Functional prototypes
- Ergonomic/fit prototypes
- Brazing fixtures

## Consumer Packaged Goods

*In an industry where every dollar counts, investing in additive manufacturing can do more than almost anything else to move your bottom line.*

3D printers provide a cost-effective, rapid way to fabricate functional parts at the point of need. They generate value wherever you deploy them – whether it's slashing R&D spend on prototypes, helping you tool up without requiring skilled machinist time, or easily mitigating costly downtime. Building an additive-centric culture in your organization will make you more responsive, agile, and enable you to scale revenue without scaling spend.

We use additive manufacturing for many of our components instead of traditional machining methods (like dies and molds), we get better results with less waste – which means less inventory carrying cost for our customers.



### MRO's 3D Printers: Why Should You Invest In Them?

- Cost-effective way to fabricate aluminum-strength parts
- You can quickly and safely fabricate real metal parts
- Managed through a single intuitive cloud platform.
- The high-accuracy machines ensure that you get the right part out every time.

### High-value Consumer Packaged Goods Applications Include

- Precision end-of-arm-tooling for ergonomic assembly fixtures
- Conformal workholding for line tooling, including brackets, sensor mounts,
- Cable management.

## Education & Research

**Additive manufacturing is a new way for manufacturers to create parts out of thin air. It's faster, cheaper, and more accurate than machining or moulding.**

**Additive manufacturing is also well-suited to the needs of educational institutions.**

Additive manufacturing has been around for a while now, but it's still relatively rare in schools – and it's even rarer at professional institutions



### MRO's 3D Printers: Why Should You Invest In Them?

- Empower your students to enter the workforce as leaders with an additive-ready mindset.
- Leverage MRO's extensive library Additive Manufacturing curriculum to take your students' knowledge to the next level.
- Fabricate parts with specialized geometries and push the boundaries of what's possible to make

### MROs 3D printers are suitable for many applications, including

- Research labs,
- Engineering clubs (SAE Minibaja/Formula and Rocketry),
- & classrooms.

## Electronic Manufacturing

*Rapid manufacturing throughout the product development process yields unparalleled value for your business.*

Electronics manufacturing's greatest need is 3D printing's greatest strength: speed. With MRO's 3D printing, engineers can reduce the barriers between ideas and functional, ESD safe parts.

This efficiency improvement has profound downstream benefits throughout the electronics manufacturing process — whether it be compressing design cycles, enabling more iteration, accelerating tooling development, or building more optimized end-use parts. Join the world's largest electronics companies on the cutting edge of fabrication.



### MRO's 3D Printers Why Should You Invest In Them?

- Functional parts are manufactured fast
- Fabricate complex parts with accuracy through precision technology
- Conformal tooling and workholding is made simple
- Continuous Fiber Reinforcement

### Electronics Manufacturing Applications

- Precised end-of-arm-tooling
- Conformal workholding
- Ergonomic functional tools
- operational prototypes
- Complex housings

## Energy

***Improve operations anywhere with smarter part production and cloud manufacturing***

Few innovations have the potential to improve operations anywhere like MRO's 3D printers.

With their ability to manufacture functional parts in a variety of chemically resistant, durable materials, these printers are ideal for a wide range of applications

Assembled parts can be used for maintenance and upgrade projects, as well as for products like miniaturized lasers and advanced medical devices.



### **MRO's 3D Printers: Why Should You Invest In Them?**

- Sturdy 3D printing enables you to print functional parts
- Durable and corrosion resistant materials can stand the adverse environments
- Point-of-need manufacturing with cloud computing manufacturing platform
- Instant print tools, prototypes, and replacement parts

### **High-value Energy Applications**

- Customized tooling
- Replaceable parts
- Grippers
- Robotic new age assemblies
- Sensor mounts
- Assembly fixtures and ergonomic jigs
- Specialized end use parts

## Federal & Defense

### *Strong parts, anywhere, anytime*

Our goal is to provide technology that enables all public sector organizations to create parts faster, with greater precision and at lower cost than traditional manufacturing processes can provide

MRO aims to enable defense sector entities to fabricate robust, accurate parts and deliver them when and where they are needed.



### **MRO's 3D Printers** **Why Should You Invest In Them?**

- Work in a wide variety of adverse environments
- Most durable, best-in-class data security available on the market
- Invest in MRO Additive Manufactured parts and get access to cutting edge composites and metal alloys.

### **A Broad Range Of High-value Federal Applications:**

- Replaceable parts
- Different Prototypes available
- Customized tooling

## Industrial Equipment

### *Manufacture better, no matter what you make*

3D printing has revolutionized manufacturing. While most modern manufacturers can benefit from adopting this technology, bringing the digital convenience of parts to your factory today and initiating unprecedented improvements in process and end-customer products tomorrow

With 3D printing, you can turn process inefficiencies and logistical headaches into competitive advantages.



#### **MRO's 3D Printers: Why Should You Invest In Them?**

- Perfect bridge between prototyping and production.
- MRO enables you to design functional parts, test them, and manufacture them quickly within a single platform.
- Multi-material, multi-part 3D printers
- This ensures that your business stays agile while also helping you reduce costs

#### **A Broad Range Of High-value Industrial Equipment Applications:**

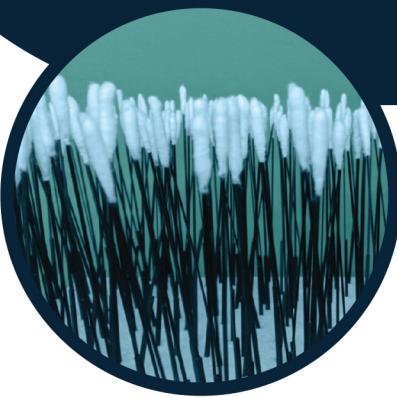
- Robotic end-of-arm tooling,
- Inspection and cmm workholding
- Reduce lead times or change processes,
- MRO 3d printers is your partner for Automation equipment and solutions.

## Medical

***Enable medical providers to fulfill their obligations as service providers with greater efficiency.***

3D printing enables companies to create customized parts more quickly and cost effectively by using computerized design software, which translates a digital model into a physical object

This technology enables engineers and designers to test new designs in-market without having to go through the traditional machining process, thereby reducing production costs and increasing efficiency.



### **MRO's 3D Printers: Why Should You Invest In Them?**

- Unparalleled design freedom
- Widest variety of performance materials in the industry.
- Leverages continuous fiber reinforcement to 3d print parts with excellent strength-to-weight ratios.

### **A Broad Range Of High-value Medical Applications:**

- Functional prototypes
- Conformal tooling
- Custom prosthetics and orthotics
- Brackets, sensor mounts, and housings
- Assembly fixtures

## Product Development

*Using 3D printing, we can speed up prototyping and create prototypes faster*

Product development involves solving hard problems with the tools that are available to you. Aggressive timelines and optimistic budgets often mean cutting corners, taking fewer risks, and compromising design intent in order to make your product a reality.

3D printing enables you to develop better products faster by providing a way to fabricate functional parts on demand. Whether it's rapid prototyping to iteratively refine designs or bridge tooling to quickly stand up production, 3D printing will help you develop better products faster



### MRO's 3D Printers: Why Should You Invest In Them?

- Widest variety of functional parts
- Continuous fiber reinforcement and metal 3d printing
- Best-in-class part accuracy
- Maintain a digital inventory of versioned parts.

### A Broad Range Of High-value Product Development Applications:

- Functional prototypes,
- Custom end-use parts,
- Prototype & first-run tooling
- Workholding.

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