



ADDITIVE MANUFACTURING APPLICATIONS

The additive industry is driven by material enhancements that enable engineers and designers to apply the technology — solving current and future problems. It's important to identify which type of printing process or selected material will make the **most sense for your application**. While prototyping currently remains the main utilization of additive manufacturing in many industries, companies are increasingly finding other use cases, such as tooling or production.

INDUSTRY KEY



AUTOMOTIVE



INDUSTRIAL



AEROSPACE



CONSUMER GOODS



HEALTHCARE

PRODUCT DEVELOPMENT



Additive manufacturing has become the primary tool for product designers to iterate quicker, fail faster and increase speed to market. Putting a physical part in your clients hands for feedback or validating your design through testing are invaluable benefits within the product development lifecycle.

Ask yourself, why aren't we using 3D printing?

Data courtesy of Symbol-Uniformia

As of 2019, over 600,000 orthopedic implants utilized metal 3D printing. This number is expected to exceed 4 million implants by 2027. (3D Printing Media Network)

CUSTOMIZATION

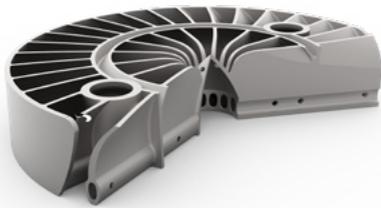


Additive manufacturing enables engineering teams to create specific and personalized products by making simple adjustments in CAD. Scientists, doctors and researchers are utilizing CT and MRI scan data to create patient-specific models that are improving outcomes and reducing operating room time.

Data courtesy of Materialise

Studies show that 1 out of every 4 surgeons practices on patient specific, 3D-printed models prior to surgery. (Gartner Research)

COMPLEX OR IMPOSSIBLE GEOMETRIES



Data courtesy of Kueppers Solutions

Conventional manufacturing and subtractive processes are inherently limited. Although these technologies are still commonplace for many industries and remain highly relevant, AM has become an ideal solution to produce parts with complex or impossible geometries.

Complex, small, closed to the surface inner channels allow to design and produce applications such as Induction coils or Heat-exchangers with previously unmatched performances.

Additive Manufacturing offers a disruptive way to think differently about part design and part manufacturing, and comes as a powerful complement to existing manufacturing methods. (Steve Fournier: The Ecosystem of Industrial Additive Manufacturing)

LOW VOLUME PRODUCTION + END-USE PARTS



Data courtesy of Bowman Additive-Production

The advancements in thermoplastic and polymer materials such as PA11 Nylon, TPU or ULTEM9085 have equipped production engineers with the ability to 3D print parts that mimic the necessary isotropic strength properties required for production.

Designing for AM (DfAM) provides the additional benefit for designers to customize designs and create honeycomb internal structures that do not sacrifice structural integrity while simultaneously producing lighter weight components.

44% of aerospace & defense organizations utilize 3D printing for maintenance and repair applications, while 39% have integrated AM for end-use, production parts. (Jabil)

MAINTENANCE, REPAIR + OPERATIONS



Data courtesy of Aerosport Modeling & Design

MRO (maintenance, repair and operations) and the spare parts industry is experiencing a massive transition. By 2025, 8% of SKUs will transition from traditional manufacturing to on demand additive manufacturing.

Motivated by the need to reduce inventory costs and eliminate lengthy lead times, manufacturers are redefining the supply chain and becoming more self reliant.

Caterpillar adopted 3D printing in 1991 for prototyping purposes and has now fully integrated AM in every aspect of their business, especially MRO and spare parts. (3D Print.com)

SPARE PARTS + WEIGHT REDUCTION



Weight reduction is an invaluable benefit that additive manufacturing provides due to the ability to create and produce complex designs. In addition, part consolidation has proven to be just as important for those who wish to simplify their parts and supply chain requirements. Instead of waiting on several different facilities to ship its required piece of the puzzle, engineers are now 3D printing these assemblies on demand.

Data courtesy of GKN Additive

50% of 3D printing users say that the technology gives them a competitive advantage in their industry. (The State of 3D Printing 2020)

TOOLING + MANUFACTURING



Arguably the most impactful and widely accepted application of additive manufacturing is its utilization for manufacturing aids, tooling, jigs and fixtures. Although it's not as attractive as 3D printing customizable bucket seats or orthopedic implants, it happens to be the most economical option for many OEMs and production facilities.

These benefits and more are possible when AM technologies are adapted to the production facility:

- Customized parts for improved functionality
- Lightweighting of parts, reducing tool fatigue
- Enhanced ergonomics

Data courtesy of GKN Automotive

Cycle times of Injection Molding or induction hardening operations can be reduced substantially by implementing cooling channels very close to the surface. Why not improve your efficiency with 3D printing?

THE FUTURE OF ADDITIVE MANUFACTURING APPLICATIONS

The speed at which additive manufacturing is evolving and list of applications evergrowing is a significant indicator of where the future of prototyping and production is heading. While the market of technologies, materials and capabilities expand so will the confusion about which application makes the most sense for your organization. Unfortunately, no singular technology will solve all of your problems so it's important to consult technology agnostic experts that have access to multiple processes, materials and have the expertise and technical know-how to guide you through.

If you're unsure how your industry is adapting to AM or want to learn more about how it can benefit your department, we invite you to learn more at www.forecast3d.com and www.gknpm.com/additive