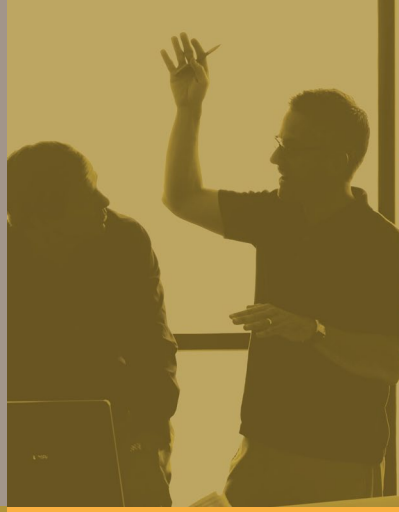


METAL ADDITIVE MANUFACTURING

Capabilities to Enhance Innovative Motion Control Solutions



Many customers are looking for ways to use technology such as additive manufacturing (3D printing) to solve motion control challenges in a new way. From enabling hydraulic flow paths that would not be possible with traditional manufacturing to making ever lighter and smaller integrated designs, Moog has been using additive manufacturing combined with its engineering, design and system knowledge to change the game for its customers.

Moog Additive Manufacturing Centers and Engineering Know-how

Moog has more than a decade of innovative Additive Manufacturing (AM) engineering, design and manufacturing expertise and has invested in one of the most advanced facilities for producing the latest designs. With 14 Laser Powder Bed Fusion (LPBF) machines, our experienced engineers use proven processes and controls to ensure every project is precision quality and takes advantage of the power that AM can bring.

Our world-class facilities include design, production, inspection and post processing capabilities. With an on-site R&D center, a metrology and material analysis lab and stress relief/heat treat ovens, Moog's experienced engineering staff works with customers to explore new designs that can provide a competitive advantage. In-house X-ray μ -CT inspection, machining, and finishing services are also available.

We are experienced using common additive metals (e.g., 17-4 stainless steel) as well as the latest materials such as Copper Cu18150 and GRCo84. With experience proving out new materials we can help our customers to select the best available alternative.



BENEFITS OF METAL AM

- Make smaller and lighter weight parts for applications where size is critical
- Highly integrated designs such as a combined valve-actuator help optimize performance and reduce part count
- Ability to make complex shapes including flow paths that are not possible with traditional manufacturing opens up new design possibilities
- Additive manufacturing is a game changer for reducing the need to stock spare parts, eliminating tooling, speeding time to market and optimizing your supply chain
- Customization and redesign opportunities can help provide real competitive advantages

APPLICATIONS

- Mobile Robotics
- Oil and Gas Exploration
- Nuclear
- Medical Mechatronics
- Aerospace

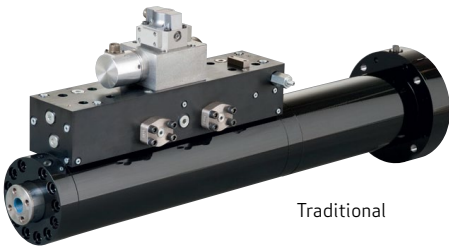
AVAILABLE MATERIALS

- Aluminum AlSi10Mg
- Cobalt Chrome MP1
- Inconel 625, 718
- Maraging Steel MS1
- Nickel Alloy HX
- Stainless Steel 316L, 15-5, 17-4
- Titanium Ti64
- Copper Cu18150 & GRCo84



CASE STUDIES

Integrated Smart Actuator



Traditional



Additive Manufacturing

Challenge: Optimize weight and size of hydraulic parts for a bio-inspired quadruped robot for rescue operations

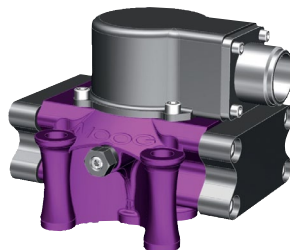
Solutions: Fully-integrated Actuator, Servo Valve, sensor, controller and software for high performance in the smallest micro-hydraulic package we have ever built

Results: Ability to fit in design-constrained envelope

G761 Servo Valve



Traditional

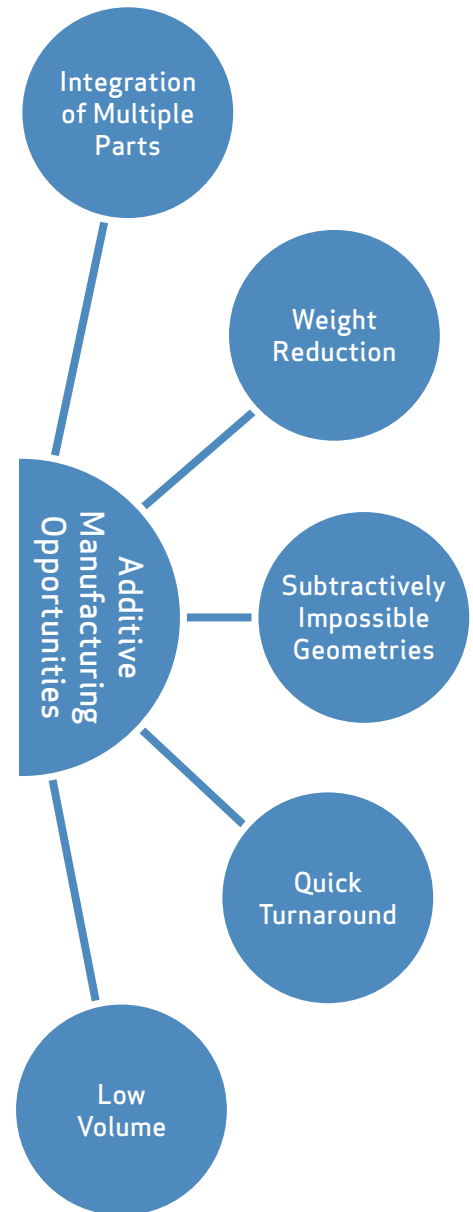


Additive Manufacturing

Challenge: Design and achieve production of a Servo Valve component with improved flow capability

Solution: The new AM design offers significant reduction in flow restrictions while keeping the same envelope size as the existing G761 body. The AM design has an integrated dovetail feature for final machining on 5 axis mill and 22.5% less mass than the existing stainless body.

Results: By leveraging AM technology we can improve flow capability by >25%



For more information, contact us online

Moog has offices around the world. Find your local office online

www.moogadditive.com

www.moog.com/industrial

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