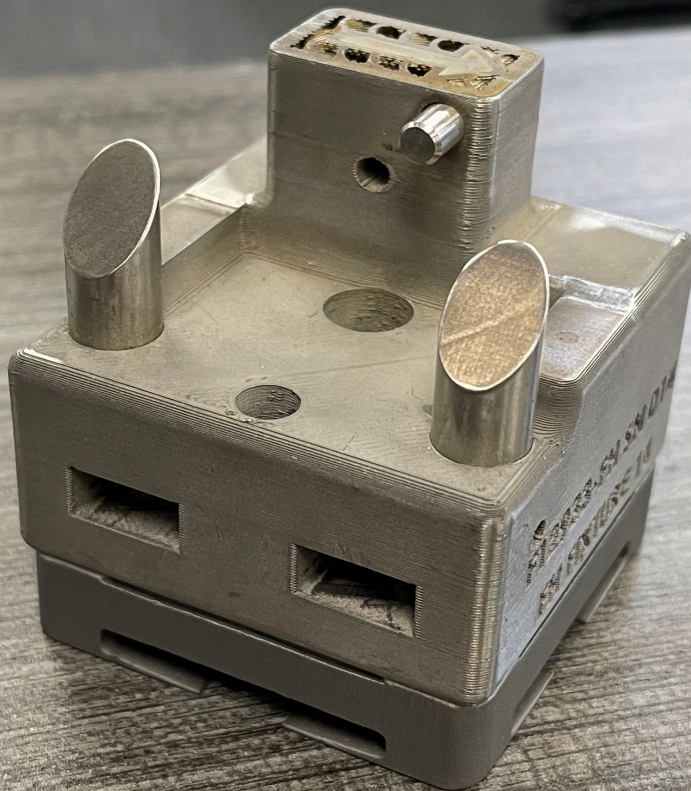


# 3D Printed Stainless Steel Tools Optimize EDM Production

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Burke Aerospace adopts Studio System to integrate metal 3D printing into operations



**Customer**

Burke Aerospace

**Location**

Farmington, Connecticut

**Industry**Aviation, defense, and industrial gas  
Turbines**Application**

Tooling fixtures

**Machine**

Desktop Metal Studio System™

**Material**

316L and 17-4 PH Stainless Steel

**Website**[www.burkeaerospace.com](http://www.burkeaerospace.com)

## Closer to customers with shorter lead times

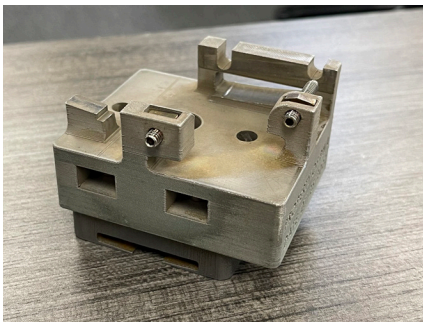
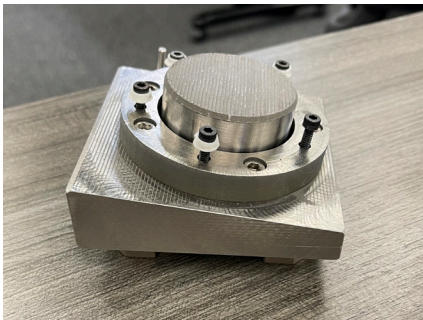
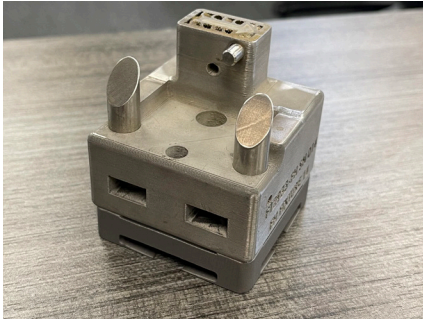
Burke Aerospace uses a variety of industrial production technologies to manufacture complex components for the aerospace, industrial gas turbines, and defense industries. Various Electric Discharge Machining (EDM) methods are used by the company to create end-use parts for critical applications like turbine blades, nozzles, shrouds, and engine cases. Additive manufacturing systems are also playing a growing role in the mid-sized, family-owned company.

The Burke Aerospace team adopted metal additive manufacturing to eliminate the lead time and design limitations of conventional tooling for its fast hole EDM process by directly 3D printing stainless steel fixtures with the Desktop Metal Studio System.

Traditionally machined in-house or outsourced to other facilities, lead times for tooling previously started at six weeks. “Our customers benefit because it greatly decreases their lead times,” said Jake Cabrila, Manufacturing Engineer and Additive Manufacturing Lead at Burke Aerospace. “They don’t have to wait for tooling with 3D printing,” he said, describing a typical weekly cycle of 3D printing multiple fixtures over two days before sintering a batch of tooling together in the Desktop Metal furnace.

The on-demand manufacturing capabilities of metal 3D printing on the Studio System helps Burke Aerospace strengthen its business ties with customers. “If a customer wants more parts from us, then we can start making tools right away,” Cabrila notes. “We don’t have to wait to machine tooling, we just start directly printing them.”

## Investing in optimized operations



Operating as part of a critical supply chain network, Burke Aerospace recognized the increasing role flexible digital manufacturing technologies would play in the future of production and, in 2021, applied for a grant from the Connecticut Manufacturing Innovation Fund. Awarded under the Additive Manufacturing Adoption Program (AMAP), the matching grant is intended to infuse 3D printing technologies into production processes of local manufacturers.

After discussions with fellow engineers in the industry about metal 3D printing systems on the market, the Burke Aerospace team invested its grant into a Studio System and furnace from Desktop Metal. “The furnace was a key selling point,” Cabrila recalled. Paired with the Bound Metal Deposition (BMD) technology of the Studio System 3D printer, the Desktop Metal Furnace creates a turn-key, two-step metal 3D printing work cell that extrudes pre-bound metal powder into complex forms and sinters them to final densities of up to 98%.

The design freedom of additive manufacturing has enabled the Burke Aerospace team to optimize designs and reduce tooling assemblies. “We’re able to make a lot more one-piece fixtures,” Cabrila said of 3D printing stainless steel on the Studio System. “If it has overhangs, we traditionally have to make separate pieces. Or with complicated geometries like undercuts or radii that would be difficult to machine, we just build with some support material and we’re done.”

The team also uses the design freedom of digital manufacturing to customize parts for free. “We mark the parts,” Cabrila explained. “We just throw that in the in the model before we print it into the design and that tool comes out marked already.”

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The flexibility of Desktop Metal BMD technology allows Burke Aerospace to produce a variety of complex fixturing designs with ease.

“I have enough to worry about that I just want to load my part in and call it a day. I’m just taking a model, throwing it in Desktop Metal software, clicking auto orient, and then print. It’s very easy.”

Jake Cabrila, Manufacturing Engineer & Additive Manufacturing Lead, Burke Aerospace

## Metal 3D printing made easy

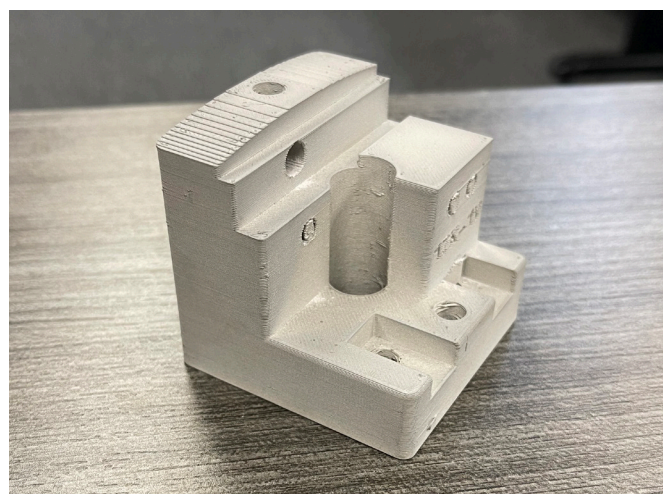
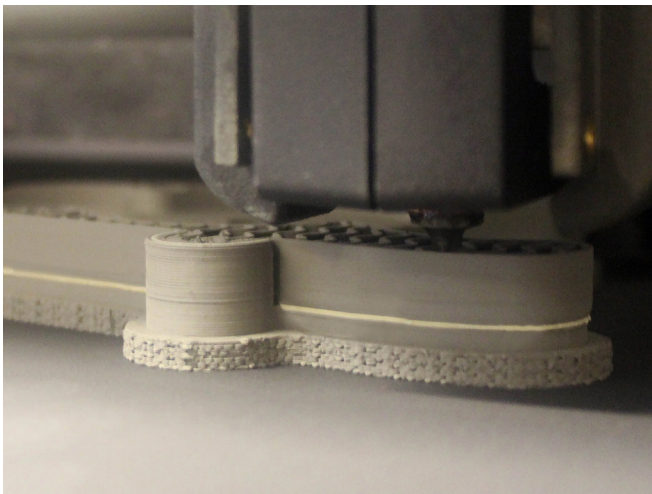
The easy-to-adopt metal 3D printing process of the Desktop Metal Studio System has allowed Burke Aerospace to quickly take advantage of benefits like optimizing manufacturing processes and decreasing lead times.

“It’s almost easier to use than the plastic 3D printers,” Cabrila says, referencing the Fused Filament Technology (FFF) and stereolithography (SLA) plastic 3D printers used by the company to create fixtures for inspection gauging. He contrasts the user input required for those systems to update parameters or change print settings with the plug-and-play nature of the Studio System.

“Desktop Metal has it sorted out – we’re using the standard settings that are already tested and loaded into the software. I have enough to worry about that I just want to load my part in and call it a day,” Cabrila said. “I’m just taking a model, throwing it in Desktop Metal software, clicking auto orient, and then print. It is very easy.”

The resulting tools deliver material properties comparable with traditional tools. Cabrila notes how the 3D printed material machines the same if critical features need finish milling or wire EDM processing.

In the first year of owning the machine Burke Aerospace has printed over 40 different fixtures on the Studio System, “and we’re running a ton of parts with them,” Cabrila emphasized.



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The Studio System extrudes pre-bound metal powder layer-by-layer, as seen above left. Right, one of dozens of 3D printed Burke Aerospace metal fixtures after sintering.



### About Burke Aerospace

Burke Aerospace is a privately held, high-tech manufacturing company supplying a variety of precision components and contracted engineering services to the Aerospace and Industrial Gas Turbine (IGT) industries. Since 1963 Burke Aerospace has been providing CNC Sinker Electric Discharge Machining (EDM), Wire Electric Discharge Machining (WEDM), High Speed Hole (HSH), Airflow testing and 5 Axis Milling services. Burke Aerospace provides all EDM and milling solution for turbine blades/buckets, vanes/nozzles, shrouds, combustor components, engine cases, and ring segments. The company has earned wide recognition for high quality, responsiveness, and lean enterprise that adds value and satisfies customers.



### About Desktop Metal Inc.

Desktop Metal, Inc. is accelerating the transformation of manufacturing with end-to-end metal 3D printing solutions. Founded in 2015 by leaders in advanced manufacturing, metallurgy, and robotics, the company is addressing the unmet challenges of speed, cost, and quality to make metal 3D printing an essential tool for engineers and manufacturers around the world. In 2017, the company was selected as one of the world's 30 most promising Technology Pioneers by the World Economic Forum, and was recently named to MIT Technology Review's list of 50 Smartest Companies. For more information, visit [www.desktopmetal.com](http://www.desktopmetal.com).