

# NATIONAL CENTER FOR MANUFACTURING SCIENCES (NCMS)

## Digital Additive Manufacturing Ecosystem: Use Case

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Virtual, secure collaboration has become increasingly vital to the way organizations operate, which has been amplified by the COVID-19 global pandemic. As a non-profit organization dedicated to improving the strength and competitiveness of US manufacturing, the **NCMS** is a thought-leader on responding and adapting to changing environments and emerging situations. One of NCMS' strategic initiatives is its partnership with the Army Research Laboratory via the Advanced Manufacturing, Materials, and Processes (AMMP) program to realize next-generation advanced manufacturing breakthroughs.

In June 2020, NCMS implemented the Digital Proving Ground: a cloud-based digital infrastructure enabling industry/academic/government users to collaborate on complex projects utilizing state-of-the-art tools and systems consolidated in an interconnected, cloud-hosted environment. This platform is designed for multiple offerings, with its first capability being a robust software suite and novel process for additive manufacturing design. This unique and groundbreaking tool allows users to remotely, securely, and collaboratively design, simulate, test, assess, and plan for the manufacturing of additively manufactured parts.

As part of the initiative to validate this offering, the objectives of the Tauber project were to refine the process for additive manufacturing design and then to demonstrate the benefit of the Digital Proving Ground to strategically position NCMS for rapid, widespread adoption of the capability. The Tauber team assessed the additive manufacturing design process using lean manufacturing principles to identify and reduce waste, making the process more efficient. Utilizing a case study method, the Tauber team partnered with Sikorsky – Lockheed Martin to identify a helicopter component with a troublesome supply chain and redesign it for additive manufacturing via the Digital Proving Ground. To test and validate the process, the team partnered with subject matter experts at both Sikorsky and Siemens to redesign the component, validate the design, and create the manufacturing plan. Finally, the Tauber team partnered with the University of Texas – El Paso to print the redesigned part.

This geographically dispersed team, with team members in Michigan, New York, Connecticut, Massachusetts, Virginia, Arkansas, Texas, and Ohio, utilized the Tauber-modified process for additive design, redesigned the Sikorsky component, and released it for production in only 62 total labor hours—a 39% reduction from Sikorsky's additive manufacturing redesign process time. This reduction in process time serves as a validation of the potential value that the NCMS Digital Proving Ground offers its users to increase efficiency and cut costs.