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RESEARCH REPORT

Unsettled Aspects of Insourcing and Outsourcing Additive Manufacturing

Kevin T. Slattery, DSc

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About the Editor

Kevin T. Slattery, DSc—Kevin is a Principal ADDvisor® at The Barnes Global Advisors. His primary expertise is in Metallic Additive and Metals Manufacturing, focusing on test program development, process and product verification, qualification, and certification. He has supported over 25 clients on five continents throughout the entire additive manufacturing value chain—from raw material to finished components. He is a 2020 Ambassador for America Makes and was part of the Materials Challenge Silver Medal team in the United States (US) Air Force Rapid Sustainment Office Advanced Manufacturing Olympics.

Kevin was previously Chief Scientist for Additive Manufacturing at Boeing Research and Technology (BR&T). He was responsible for developing and integrating the technology roadmaps and development plans for metallics additive manufacturing for the entire company, along with building and leading a multi-skilled team to execute and deliver the technology throughout the enterprise. Prior to that, he was Chief Scientist for Metals, Ceramics, and Mechanical Systems at BR&T, with the responsibility for portfolio development and coordination, while executing the additive manufacturing portion.

He served as Division Chief Engineer for the US Navy and US Air Force fighter aircraft and US Army rotorcraft in Boeing's military sustainment organization. From 1997 to 2012, he was on the BR&T Metals Team as a researcher and senior manager, where he primarily developed advanced low-cost titanium-processing technologies supporting all Boeing products. He was the technical and programmatic lead in implementing the first aerospace metal-additive-manufactured structural aircraft components for both spares and production, with five other first-in-the-industry technology implementations.

He began his career at McDonnell Douglas (now Boeing) as a nondestructive testing engineer, where he developed inspection technologies for metallic and composite components, along with integrating the impact of discontinuities with the acceptance criteria for carbon/epoxy composites.

Dr. Slattery holds a BS and MS in Metallurgical Engineering from the University of Missouri-Rolla (now Missouri S&T) and a DSc in Material Science and Engineering from Washington University in St. Louis. He currently holds 37 US patents, with another 14 applications pending, along with 36 significant publications and conference presentations.

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Unsettled Aspects of Insourcing and Outsourcing Additive Manufacturing

Abstract

Additive manufacturing (AM), also known as "3D printing," has transitioned from concepts and prototypes to part-for-part substitution—and now to the creation of part geometries that can only be made using AM. As a wide range of mobility designers and manufacturers begin to introduce AM parts into their products, the question between insourcing and outsourcing the manufacturing of AM parts has surfaced. Just like parts made using other technologies, AM parts can require significant post-processing operations. Therefore, as AM supply chains begin to develop, the sourcing of AM part building and their post-processing becomes an unsettled and important issue.

As the sixth in an ongoing series of SAE EDGE™ Research Reports on AM, the approaches and trade-offs of the different sourcing options for production hardware are discussed in multiple scenarios. While it will focus on metallic components and technologies, which tend to have more post-processing, it will cover these topics for a polymer part as well.

NOTE: SAE EDGE™ Research Reports are intended to identify and illuminate key issues in emerging, but still unsettled, technologies of interest to the mobility industry. The goal of SAE EDGE™ Research Reports is to stimulate discussion and work in the hope of promoting and speeding resolution of identified issues. SAE EDGE™ Research Reports are not intended to resolve the challenges they identify or close any topic to further scrutiny.

Notes on Terminology

Insourcing: The practice of having material or value-added services provided within an organization with the same owners or board of directors; the ultimate authority for dispute resolution is the chief executive officer (this includes obtaining services from other divisions or bureaus with the same overall company)

Original equipment manufacturer (OEM):

- **Product OEM:** Organization that makes the product (e.g., automobile, aircraft, launch vehicle) that is sold (or provides mobility) to the customer
- **Part OEM:** Organization that makes a part that goes into a larger product

Outsourcing: The practice of having material or value-added services provided by an organization with different owners or board of directors; the ultimate authority for dispute resolution is a governmental judiciary

Product: What the using organization purchases from the manufacturer

Product team: The integrated team for a product or a substantial sub-part of a product

Using organization: An organization that uses a product and is concerned with keeping the product operational

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