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RESEARCH REPORT

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Kevin T. Slattery, DSc

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Kevin T. Slattery, DSc - Kevin is a Principal ADDvisor® at The Barnes Group 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.

Kevin was previously the Chief Scientist for Additive Manufacturing at Boeing Research and Technology (BR&T). He was responsible for developing and integrating the technical roadmaps and development plans for metallic 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 the 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 the Division Chief Engineer for the U.S. Navy and U.S. Air Force fighter aircraft and U.S. 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, along with five other first-in-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 BS and MS degrees 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 36 U.S. patents, with another 15 applications pending, along with 36 significant publications and conference presentations.

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Abstract

Depending on the industry and application, views on additive manufacturing (AM), or "3D printing," range from something that will transform an industry to it being another overhyped technology that will only find niche applications. Most views fall somewhere in between, with the most common one being that it depends on the application and technology. Because of the ability to directly produce parts from a digital file, views often include dependence on when and where the part is needed. This introduces the crux of the matter, which is how to determine when the use of AM is feasible and desirable, which is made all the more complicated by the fact that not only is AM technology in general changing quickly, but also the merits of the each AM technology relative to the others are also changing. Finally, non-AM technologies are continually improving and are increasingly adding AM-like capability.

As the opening report of a six-part series of SAE EDGE™ Research Reports on AM, this paper discusses unsettled issues pertaining to the benefits, drawbacks, and trade-offs, as well as the decision-making processes to be followed in determining the feasibility and desirability of using AM.

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.

Regarding Terminology

- System refers to an end product that serves a unique role to the user (aircraft, automobile, etc.).
- Part refers to an individual component that cannot be taken apart without destroying it (machinings, stampings, weldments, etc.).
- Subsystem refers to a distinct collection of parts within a system (braking, actuation, etc.) or structure (trunk lid, flap, etc.) that have a defined role.
- Subassembly refers to a collection of parts, or a series of parts unitized together, that performs a defined role in a subsystem.

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