

REVOLUTIONIZING ADDITIVE MANUFACTURING TO CHANGE THE WAY WE MAKE ALMOST EVERYTHING

America Makes, a Manufacturing USA® institute, develops and expands U.S. capabilities in additive manufacturing and 3D printing. The institute is creating U.S.-based sources of world-class equipment and support, a robust domestic supply chain of high quality materials and services, and a highly skilled U.S. workforce to capitalize on the capabilities and advantages of additive manufacturing and 3D printing.

Manufacturing USA, a public-private partnership with 14 manufacturing institutes across the nation, connects companies, academic institutes, non-profits, and local, state, and federal entities to solve industry-relevant advanced manufacturing challenges in new technology areas with the goals of enhancing industrial competitiveness and economic growth and strengthening national security.



Technology Focus Area

Additive manufacturing uses layering of materials to create lighter, stronger three-dimensional parts and systems. 3D printing is perhaps the most well-known technology of additive manufacturing, yet many others exist.

Additive manufacturing: reduces automotive part count from thousands to hundreds; increases flexibility in design options that meet consumer specifications; improves product performance, reduces costs, and shortens lead times. In medicine, the technology enables breakthroughs in patient-specific treatments, medications and drugs, personalized joint and cranial implants, implanted tracheal supports to treat birth defects, and custom-fitted hearing aids.

Approach to Innovation and Collaboration

America Makes brings together partners in industry, government, and academia to explore solutions to challenges that can be achieved through additive manufacturing and 3D printing. This is done through initiatives such as:

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Youngstown, Ohio
330-622-4299
americamakes.us



America Makes Digital Storefront, an online platform for accessing information, data, and intellectual capital assets



Technology roadmaps defining industry needs



Curated concepts for public-private partnership **projects** focusing on design, process, material, value chain, and an additive manufacturing genome examining material property



Workforce training through education in 3D printing materials, technologies, and products

COLLABORATIVE PROJECT EXAMPLES

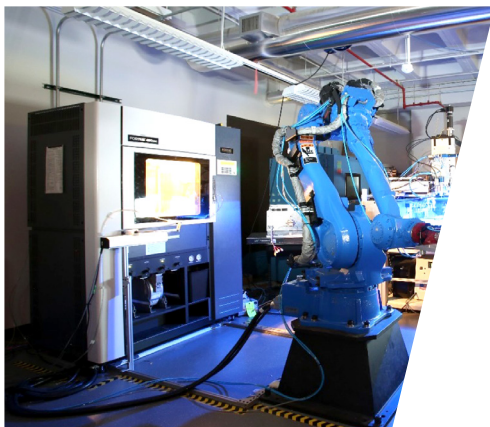
“While we are on the cutting edge of many developments in 3D printing, it takes collaborations to help propel complex technologies into viable commercial applications. We’re proud to connect with other leading thinkers in this space through America Makes.”

– Sarah Webster, Global Marketing Director, EnvisionTEC



SUSTAINMENT FOR LEGACY AIRCRAFT: U.S. Air Force legacy aircraft are on average 27 years old and require critical parts that are out of production. This project focuses on emerging technology analyses, demo projects, and development for Air Force stage gate reviews to demonstrate how advanced manufacturing technologies can let the Air Force replace critically damaged or obsolete components on-demand, rapidly fabricate needed shop tools, and address workforce education gaps in manufacturing that are critical to U.S. national defense. The team includes dozens of project partners working under the direction of the University of Dayton Research Institute, the U.S. Departments of Defense and Energy, National Science Foundation, and industry leaders including Boeing, Raytheon, and Lockheed Martin.

ACHIEVING CONSISTENT QUALITY IN ADDITIVE MANUFACTURING: The need to develop better measurement techniques for additive manufacturing has limited the technology’s use in performance-critical parts and made quality requirements difficult to achieve. This project—a partnership between the National Institute of Standards and Technology (NIST), University of Louisville, and Concurrent Technologies Corporation—used *in-situ* process monitoring, non-destructive evaluation, and layerwise quality certification to achieve broader application of additive manufacturing through certification standards, post-build inspection and verification, and deployment of sensors and techniques that can be adapted to any industrial additive manufacturing process.



INTEGRATING TECHNOLOGIES TO IMPROVE MANUFACTURING EFFICIENCY: America Makes led a team to design and assemble a new Multi3D system, which reduced cost and reduced space requirements by more than 50 percent. The Multi3D system has a five-axis motion platform for additive manufacturing, subtractive manufacturing, and foil/wire embedding, demonstrating the capability to design and manufacture multifunctional components within a single enclosed unit. Project partners included the University of Texas—El Paso, Northrop Grumman, Lockheed Martin, Stranepresse, AST2, and Draper Laboratory.

“America Makes has been pivotal in creating an integrated community involving machine builders, materials developers, designers, and most importantly, a broad collection of firms pushing the boundaries of manufacturing in all its forms.”

– James McGuffin-Cawley, Associate Dean of Research, Case Western Reserve University