



Additive Manufacturing of Parts and Electronics

The Best Ally at All Stages of Product Lifecycle Management



KBR's Development and Integration (DI) Program uses AS9100 certified processes to develop, design, manufacture, modify, repair, rework, integrate, test, install, and sustain components of complex aerospace mission systems. KBR owns 3D CAD/CAM design and analysis tools, metrology grade 3D scanners, high-end industrial additive manufacturing 3D printers, and post-processing cleaning systems. With these tools, we can rapidly realize the physical creation of virtual solid-model designs using innovative printed plastic and electronic parts. These capabilities are routinely used for concept mock-ups, or production form, fit, and function.

AREAS OF EXPERTISE

Development and optimization of designs to meet the requirements for engineering concepts, rapid product development, and production of end-item additively manufactured parts and assemblies using Lights-out Digital Manufacturing (LDM).

Big Data: Increasing volumes of data can slow the “data-to-decision” cycle.

Savings: Lower time, costs, and risk with rapid iteration of prototypes, final design checks, and low-volume production using a wide variety of additively manufactured plastic parts and circuit boards, made with blended resins and nanomaterials from KBR's in-house 3D printers.

Reverse Engineering: Using in-house 3D scanners, KBR engineers can digitally capture complex mechanical details and geometries of components, assemblies, or systems to create solid models that can be directly 3D printed to replicate the parts for use or model verification.

Sustainability: Produce less waste, scrap, and other byproducts when creating parts through additive manufacturing versus subtractive or chemical manufacturing.

Innovation: Rapidly analyze alternatives and conduct real-time concept trade studies and testing in our well-outfitted DI Laboratory.



Additive Manufacturing of Parts and Electronics



PROVEN PERFORMANCE

KBR's DI Program has been operating additive manufacturing equipment for more than 15 years. KBR has more than 35 years of expertise performing part and assembly design, and system qualification tests for defense, civilian, and commercial systems.

On-site capabilities include:

Stratasys Objet500 Connex3 PolyJet Multi-Material 3D

Printer: Ability to print large or small, multi-material, multi-color, high-resolution and high-quality parts and assemblies in high-quantity with a wide range of material properties.

Nano-Dimensions Dragon Fly LDM 3D Electronics

Printer: Multi-material 3D electronics printing uses additive manufacturing to combine conductive Nano-Silver material and dielectric polymers to create ready to use novel and custom 3D electronics circuit components and Printed Circuit Boards (PCBs).

Formlabs Fuse1 Selective Laser Sintering (SLS) Printer:

SLS technologies allow for higher packing densities of parts within the printer for higher-volume print capacity and low risk of fatigue failure relative to other additive manufacturing technologies.

Ultimaker S5 Fused Deposition Modeling (FDM)

Printer: FDM technologies have been the most prevalent printing technology for low-cost scalability of additive manufacturing and can inexpensively be deployed for

decentralized manufacturing. High variability in materials allows for the tailoring of material properties to each application. Ability to use non-proprietary materials lowers costs and frees the printer to quickly implement the latest material technology.

Other 3D Printer Capabilities: Stratasys Objet 30Pro PolyJet 3D Printer; Stratasys F170 and F900 FDM 3D Printers for structural parts; 3D Systems Model Pro, MakerBots, etc.

Post-Processing of PolyJet & FDM Parts: PPT FORTI System for ultrasonic and detergent cleaning of soluble support materials; PADT SCA3600 for detergent or water cleaning of soluble support materials; Balco Water Jets for removal of soluble support materials; Walnut Media Blasting Cabinet for SLS Powder removal and surface finishing; Media Tumbler for SLS Powder removal and surface finishing.

WHY KBR?

As a leading systems engineering and integration provider, KBR's domain expertise spans several decades during which it has supported all major Navy, Army and Air Force programs. The company continues to drive innovation by combining engineering, technical and scientific expertise with full lifecycle capabilities, mission knowledge and future-focused technologies. This strategy embraces efforts to make development more agile with rapid prototyping.

NEXT STEPS

Let's talk about your additive manufacturing goals and how KBR can help you achieve them. Contact Wayne Devereux, Program Manager, Development and Integration Program at wayne.devereux@us.kbr.com.

ABOUT US

We deliver science, technology and engineering solutions to governments and companies around the world. KBR employs approximately 28,000 people performing diverse, complex and mission critical roles in 34 countries.

KBR is proud to work with its customers across the globe to provide technology, value-added services, and long-term operations and maintenance services to ensure consistent delivery with predictable results. At KBR, We are the Team Behind the MissionSM.