Markforged:
X7 Field Edition

NCMS Technology Showcase
FRC East

PROBLEM STATEMENT

The DoD faces many challenges supporting its aging fleet and diverse global operation which can be improved by integrating advanced manufacturing technology. This aging fleet has many major support hurdles such as: part obsolescence, diminishing manufacturing sources, lack of technical data, inconsistent data collection, rising cost of inventory, risk management, and multiple legacy support systems.

Supply chain management in forward deployed locations being of the utmost importance, using traditional methods can take weeks to months for a critical replacement part or component to reach the point of need. Resulting in increased downtime and delays.

BENEFITS

The X7 Field Edition is purpose built to enable end users to deploy 3D printing into theater level maintenance to increase resilience and flexibility. By printing tools and replacement parts for critical equipment the USMC will be able to recover faster when parts break, operate with less on-hand inventory/when existing supply chains are disrupted, and save money from transporting fewer parts around the world.

Using the Markforged X7 Field Edition 3D printer enables the end user to print parts with a 1-for-1 replacement of 6061 T-6 Aluminum in tensile strength while being half the weight of traditional aluminum. Resulting in significant strength to weight ratio and overall component weight reduction

TECHNOLOGY SOLUTION

The X7 Field Edition first articles are currently being tested by the USMC in support of the XFAB Program and are targeted for deployment in FY21. As it stands, this solution fits within a 36” x 36” x 36” volume when packed and weighs less than 190lbs. The current packaging contains enough material to print for 84 hours (12hrs/day for 1-week). This printer is able to be unpacked and printing in under 10 minutes in the roughest of climates. Finally this printer operates completely offline, but can have WiFi capabilities if needed.

The Markforged platform consists of a patented technology using Continuous Fiber Reinforcement, this is a cost effective solution for replacing traditional metal parts with 3D printed composite parts resulting in similar strengths at a fraction of the weight. Continuous Fibers can be inlaid in thermoplastics using Continuous Filament Fabrication (CFF) technology. The X7 using this method can lay continuous strands of high strength fibers (such as carbon fiber, fiberglass, or Kevlar) via a second print nozzle within FFF-extruded thermoplastics while printing. The reinforcing fibers form the “backbone” of the printed part, yield stiff, strong, and durable results. This enables the end user to replace vehicle or personal equipment

GRAPHIC

Markforged Tactical X7

Consumables and materials packaged inside the tactical pelican case