



Beyond BIG | Marine Corps XFAB Case Study

3D Printer Supports Marine Corps through its mobile XFAB laboratory

MCTSSA, or Marine Corps Tactical Systems Support Activity, provides directional support to the Marine Corps and Joint Service command, control, computer, communications, and intelligence (C4I) architecture. The MCTSSA does this through communications exercises, cyber testing, tactical networking, and more. Recently, the MCTSSA hosted a team of design experts responsible for testing the network connectivity of XFAB, also known as the portable expeditionary fabrication lab. This lab is essentially an additive manufacturing hub that can be readily deployed for support maintenance duties that include fabrication and repair or modification of equipment. It features one of our popular large format printers, the 300 Series Workbench Pro.

Photo by Amy Forsythe
U.S. Marine Corps



United States Marine Corps

Marine Corps Tactical Systems Support Activity (MCTSSA) conducts testing, evaluation, engineering, and provides direct technical support to the Fleet Marine Forces for Marine Corps and Joint Service command, control, computer, communications, intelligence (C4I) systems and expeditionary combat vehicle systems in order to inform acquisition decisions to make Marines more capable.

Why BIG

The 300 Series large format printer from 3D Platform offers the highest print volume dimensions within the group of 3D printers, with a robust 1000 mm x 1000 mm x 700 mm (0.7 m³, 1.4x).

XFAB

XFAB is a transportable and self-contained, additive manufacturing lab that can be deployed with battalion-level Marine maintenance units. The lab is 20-by-20 feet and is collapsible for easier transport. Inside there are five 3D printers including two desktop printers, two industrial carbon fiber printers, and the 300 Series large format printer from 3D Platform. In addition, the lab includes laser scanners and cutters, and a corresponding computer design software system.

The XFAB container is powered by a generator or shore power, and can be set up or torn down by a team of four Marines in roughly two-to-three hours. Its weight, when fully equipped, tops the scales at about 10,500 pounds and can be transported via the Logistics Vehicle System Replacement or a typical commercial flatbed truck.



Photo by Amy Forsythe / U.S. Marine Corps

The project officer for Fabrication Equipment, from Marine Corps Systems Command and Lead Developmental Tester for the Logistics Combat Engineer Systems portfolio inspect the 3D printed all-purpose wrench during the testing and demonstration of the portable expeditionary fabrication lab, otherwise known as XFAB.

3DP in the Field

XFAB has been in development for over five years, and will eventually provide Marines with an opportunity to fabricate their own manufacturing tools, parts, and signage. 3DP printers will help provide much-needed support in forward-deployed expeditionary environments where specialty and hard-to-find parts are not readily available.

The 300 Series large format printer used in this demo employs patented SIMO Series linear motion actuators from PBC Linear that provide movement along the X-Y-Z gantry. SIMO is an acronym for Simultaneous Integral Milling Operation, and is a process developed and patented by PBC Linear that uses synchronized cutters, eliminating built-in extrusion variances by machining all critical edges concurrently in one pass. This process, along with the actuator's Constant Force™ anti-backlash lead screws and nuts, will provide high precision and strength in a variety of environments that XFAB will encounter on their missions.



Demo Day



U.S. Marine Cpl. Tyler Anglin from 1st Maintenance Battalion holds a 3D printed universal load stud wrench during a demonstration event at Marine Corps Tactical Systems Support Activity.

Photo by Amy Forsythe / U.S. Marine Corps

The testing event at MCTSSA included senior leaders and Marines from 1st Marine Logistics Group, 1st Light Armored Reconnaissance Regiment, 3rd Amphibious Assault Battalion and 3rd Marine Aircraft Wing. The demo offered them a first-hand look at the equipment and how they can manufacture parts and products.

The main goal of this event was to first evaluate the connectivity of the Marine Corps' closed computer network and then determine if any adjustments are needed. The ultimate objective is to reach final operational capability and then begin delivering labs to the Fleet Marine Forces by June 2022.