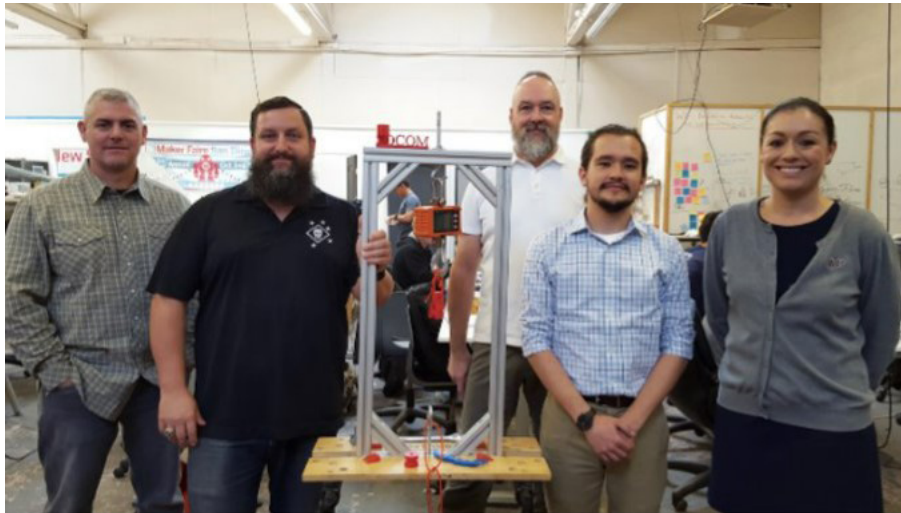


*AM training sessions developed and delivered to educate SOF personnel*

## Special forces personnel received in-depth training on AM design and practices aligned to SOCOM needs



*Training staff and artifact testing apparatus.*

### PROBLEM

There is a lack of knowledge in the application of additive manufacturing (AM) processes within the Special Operations Forces (SOF) community. Many personnel is untrained and unaware of the diverse potential of these processes. To further advance this sector, SOF personnel must undergo a formal training process and apply these skills to the versatile applications AM can achieve in forward operating positions.

### OBJECTIVE

The purpose of this project effort was continued support to expeditiously initiate a federalized Advanced Manufacturing Enterprise capability to enable worldwide, distributed SOF operations. This effort focused on two major areas: 1) Additive Manufacturing (AM) professional development of SOCOM personnel and 2) AM enterprise current assessments and actionable scalability recommendations.



**AMERICA MAKES  
TECHNOLOGY  
DEVELOPMENT  
ROADMAP**

This project aligns to:



**PROCESS**

**ASTM PROCESS  
CATEGORY:**  
Material Extrusion

**EQUIPMENT:**  
Lulzbot TAZ 6  
3D Printer

**MATERIAL:**  
Thermoplastics

## TECHNICAL APPROACH

The project team utilized several techniques in their technical approach. The team first assessed SOF-specific mission needs through interviews and workshops with program executives, frontline operators, industry, and advanced technology subject matter experts with the purpose of, initiating and implementing AM to push the leading edge of technology application to enhance combat capability within the Special Operations Forces. From these assessment findings, the team designed and developed classroom settings, classroom materials, possible projects, use cases, maintenance instruction manuals, proper packaging procedures, and storage/transportation procedures for conducting mobilized AM training at Point of Need (PON) locations identified by the Special Operations Command (SOCOM) Program Manager. The team also developed and delivered both a Level 1 training course curriculum that focused on an introduction to 3D design and AM manufacturing as well as a Level 2 training course that provided in-depth training on advanced 3D CAD design, advanced AM training, and a SOF-relevant capstone project.

## ACCOMPLISHMENTS

Over a two-and-a-half-year time period, the SOCOM training program has progressed into a mobile training element that is able to be deployed specifically for training active-duty combat and support elements to augment existing manufacturing capabilities to include additive manufacturing. Instructional Level 1 training sessions were held at multiple on-site locations during 2016-2017 including AFSOC located at Hurlbert Field, FL; SOAR located at Fort Campbell, KY; MARSOC located at Camp Pendleton, CA; NSWG-2 located at Camp Little Creek, VA; and SDVT-1 located at NS Pearl Harbor, HI. Level 2 training was developed to provide a more in-depth level of AM training that was conducted at the University of Texas El Paso (UTEP) College of Engineering which was well-suited for supporting both students and training equipment. The location provided good access to the W.M. Keck Center for exposing students to not only the FDM process the course is centered around but the various types of other AM processes at the center. Both SOF and Marine Corps personnel attended the Level 2 class that took place in November 2017. More than 125 Special Force operators and support personnel were trained during this period of performance.

## PROJECT END DATE

November 2017

## DELIVERABLES

- Assessed and documented needs of AM materials, processed quality and limitations for individual SOF units
- AM Training curriculum, training hardware and support equipment for conducting on-demand AM training at Special Operations Forces (SOF) locations
- AM training at SOF sites
- Actionable site-specific Course of Action (COA) recommendations

## FUNDING

**\$745,800 total project budget**

## PROJECT PARTICIPANTS

### Project Principal:

NCDMM/America Makes

### Other Project Participants:

U.S. Special Operations Command (SOCOM)  
University of Texas El Paso (UTEP)  
Defense & Energy Systems  
3D Simulations

### Public Participants:

U.S. Department of Defense