

# MARINE CORPS

## ADDITIVE MANUFACTURING

COL HOWARD MAROTTO  
INSTALLATIONS & LOGISTICS





# AM is Real, Effective, Disruptive and Revolutionary



Marine Corps Chief Warrant Officer 2 Daniel Rodriguez, a maintenance officer with Combat Logistics Battalion 31, 31st Marine Expeditionary Unit, holds a 3-D printed plastic bumper for an F-35B Lightning II landing gear door aboard the multipurpose amphibious assault ship USS Wasp while underway in the Pacific Ocean, April 19, 2018. Marines with CLB-31 are now capable of “additive manufacturing,” also known as 3-D printing, which is the technique of replicating digital 3-D models as tangible objects. Marine Corps photo by Cpl. Stormy Mendez



Marine Corps Sgt. Adrian Willis, a computer and telephone technician with Combat Logistics Battalion 31, 31st Marine Expeditionary Unit, prepares to print a 3-D model aboard the multipurpose amphibious assault ship USS Wasp while underway in the Pacific Ocean, April 7, 2018. Marine Corps photo by Cpl. Bernadette Wildes

**UNCLASSIFIED**



# AM Warfighting Benefits



## Warfighting Benefits

## How

**More effective & lethal platforms**

Lattice structures  
Multi-functional materials  
Embedded sensors and components



**Tailored solutions for the mission and warfighter**

Armor  
Weapons/Munitions  
Medical implants and surgical tools  
Unmanned systems  
Platform components



**New era of supply chain independence**

Improved field fabrication  
“Good enough” parts  
Environment-independent printers



**Reduced sustainment costs & increased responsiveness**

Consolidated assemblies  
Rapid reverse-engineering  
Support of depot and maintenance operations



**Accelerated capability development**

Rapid prototyping  
Urgent need response  
Warfighter prototyping



AM is a critical enabling capability that has potential to revolutionize the supply chain and support technologies that will comprise our future Offset



# Marine Corps Additive Vision



**Expeditionary Goals:** Reduce stockpile of spares, leverage critical nodes in Supply Chain, decrease Supply Chain complexity

## Revolutionary New Capabilities

### Printing the "Iron Mountain"



5. Advanced Additive-Enabled Systems and Incorporate AM into Acquisition



4. Expeditionary Manufacturing & Repair



3. Supply Chain Reduction

2. Obsolescent Manufacture & Repair



1. In-Field Fabrication



### Enduring Themes:

- Digital Infrastructure
- Qualification/Certification
- Dept of Defense Policy
- Industry Business Model
- Workforce Training

## Evolutionary Improvements

## In Equipment Readiness

UNCLASSIFIED



# Collaboration Efforts



- **Coalition/NATO Exercises**
  - CWIX '18, Poland
  - Trident Juncture '18, Norway
- **Bi-lateral Exercises/Demonstrations**
  - From full-fledged, on site integration to virtual efforts via data transfer and printing
- **Information Exchange Agreements**
  - Leverage Domestic AM Industrial Bases
- **DoD/NATO AM Parts/Item Repository**
- **Employment in Operational Environments**



# QUESTIONS?



**"Is it a pimply adolescent, now awkward, but promising future vigor?"**

**Or has it arrived at maturity, full of languor, surrounded by disappointments?"**

- Donald G. Fink, Western Electric, 1953. Speaking about the maturity of the germanium transistor which would rapidly evolve into the microprocessor

