



U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND C5ISR CENTER

Diminishing Manufacturing Sources and Material Shortages (DMSMS) and Additive Manufacturing (AM)

DSIAC Webinar

8 NOVEMBER 2023

TODAY'S DISCUSSION





Image source: Alpha Stock Images

- DMSMS and Obsolescence
- Proactive vs. Reactive
- Challenges and Resolutions
- Additive Manufacturing (AM)
- How AM Can Support DMSMS

DMSMS OVERVIEW



Diminishing Manufacturing Sources and Material Shortages (DMSMS)

Loss, or impending loss, of manufacturers or suppliers of items, raw materials, or software

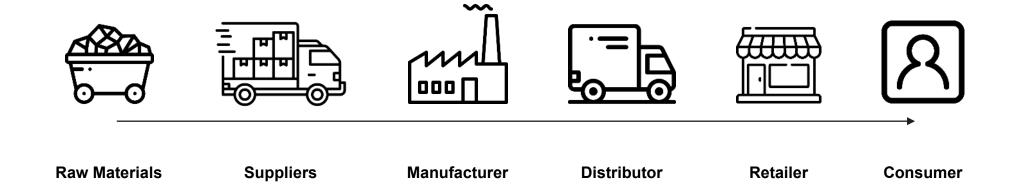


Image source: flaticon.com

OBSOLESCENCE

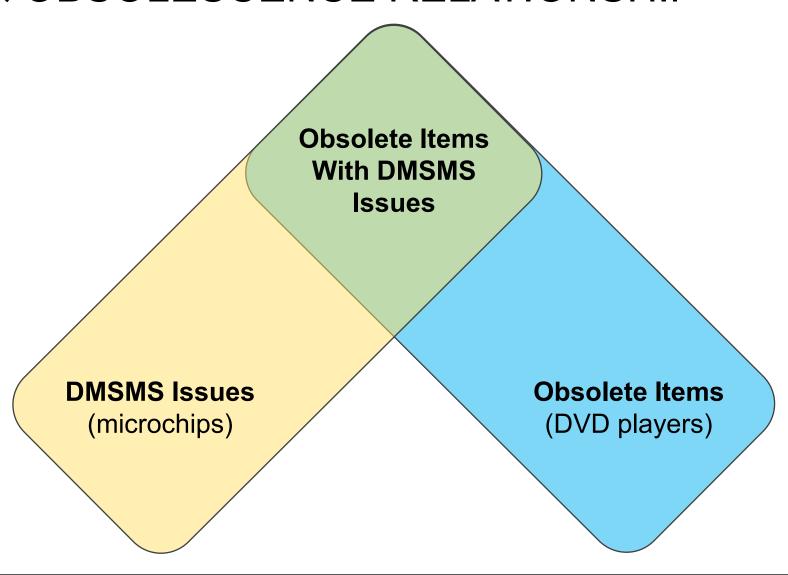


- Several official resources define "obsolescence" in slightly different ways:
 - SD-22: a part is obsolete when it is "...out-of-date and superseded by something new."
 - **DFARS**: parts which are "...no longer available from the OEM or an authorized aftermarket manufacturer."
 - IEC 62402:2019: an obsolete part is one which "...is no longer in production from the manufacturer in accordance with the original specification."

Parts are not obsolete simply because they are hard to find.

DMSMS & OBSOLESCENCE RELATIONSHIP

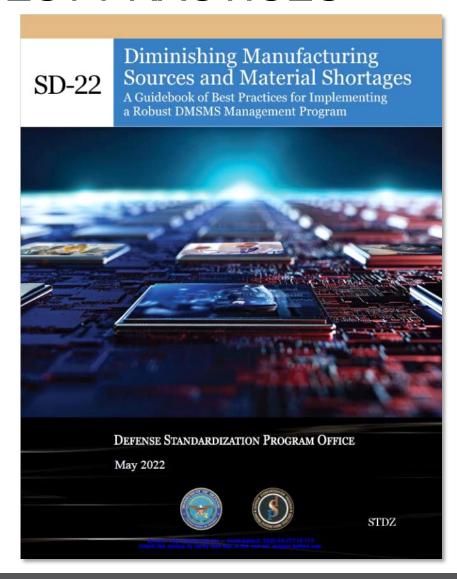




There is no DMSMS issue if needed quantities can be found.

SD-22: DMSMS BEST PRACTICES





Download PDF: https://quicksearch.dla.mil/qsDocDetails.aspx?ident_number=275490

DMSMS MANAGEMENT PROCESS



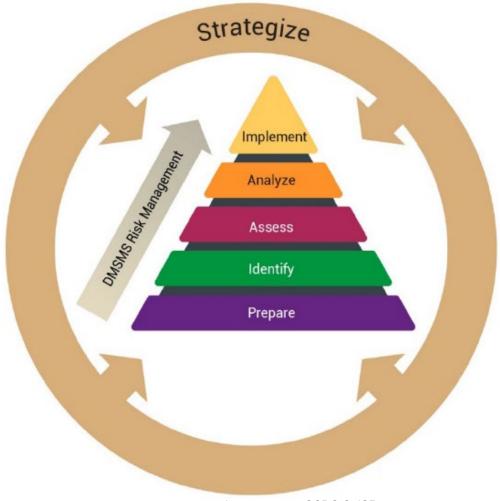


Image source: CCDC C5ISR

All things go obsolete eventually.

DMSMS STEPS EXPLAINED



- Prepare the foundations for DMSMS processes and management.
- *Identify* items with obsolescence risks.
- Assess when and at what level (e.g., item or next higher assembly) to resolve the issue.
- Analyze the most cost-effective resolution.
- *Implement* the resolution.
- Strategize by evaluating results for DMSMS processes, improving effectiveness and efficiency.

Each of these steps applies throughout the system life cycle.

PROACTIVE VS. REACTIVE



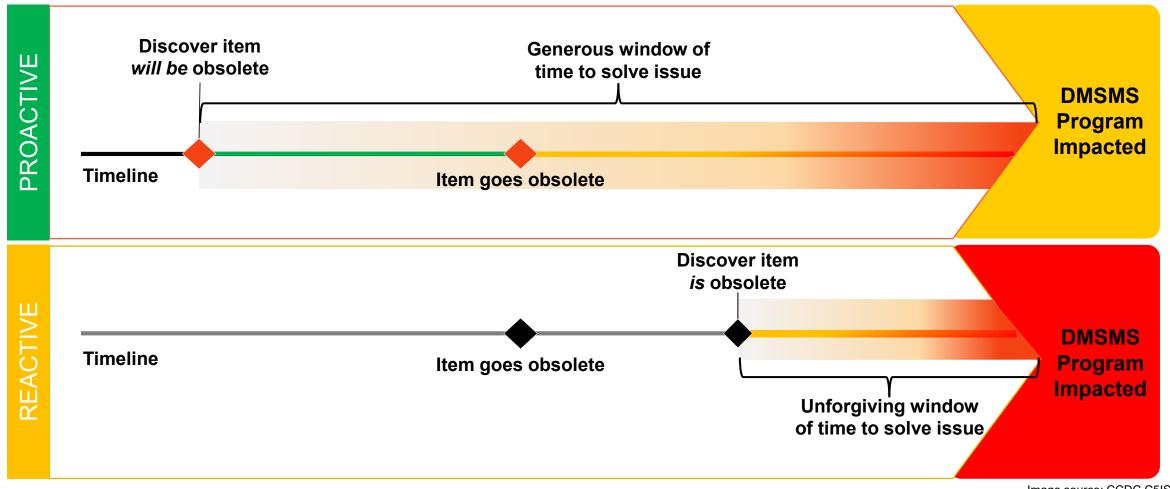


Image source: CCDC C5ISR

PROACTIVITY BEST PRACTICES



- Monitoring and Surveillance
 - Continuous canvassing of commercial market for changes in your parts
- Data Management
 - The what, when, where, and how of data capturing, cataloging, and utilization
- Roadmaps
 - Data visualization tool that identifies when items are to be replaced or refreshed
- Risk Identification
 - Selects and prioritizes items most at risk for current and future readiness or availability impacts
- System Readiness Health Evaluations
 - Snapshot of obsolescence health of the system design
- Case Management
 - Tracks and manages DMSMS issues from identification to resolution

PROACTIVE DMSMS EFFORTS





Image source: CCDC C5ISR

A proactive strategy is a collaborative effort between government and industry.

COMMON CHALLENGES



Funding

- Not enough
- Takes too long to get

Economy of Scale

 Manufacturer's minimum production run for part vastly exceeds weapon system demand and/or budget

Lead Time

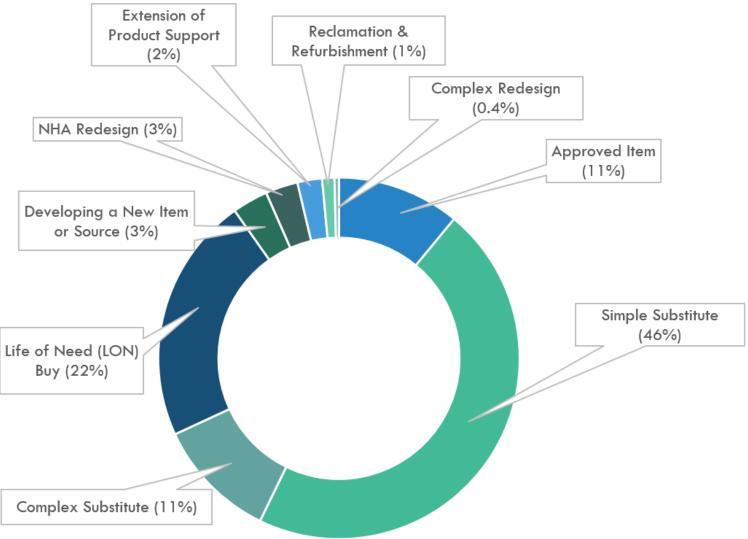
- Too long to get existing parts delivered
- Too long to have parts made

Form/Fit/Function

 New part model has changes that make it difficult or impossible to use with current system design (e.g., PS/2 Port vs. USB)

DMSMS RESOLUTIONS





Percentages per SD-22

THE QUALITY TRIANGLE



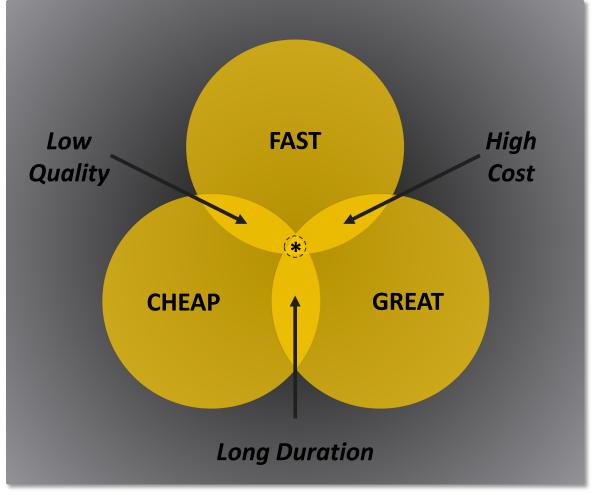


Image source: CCDC C5ISR

* Unattainable

There are no solutions, only tradeoffs.

ADDITIVE MANUFACTURING.... ATSM DEFINITION



The process of making a three-dimensional solid object of virtually any shape from a digital model using an additive process, where successive layers of material are laid down in different shapes.

- Seven commonly accepted types.
- Rapidly growing industry thanks to advances in computing, machine controls, expiration of original patents, etc.
- 3D printing is a subset of AM.

ADDITIVE MANUFACTURING.... WHAT MOST PEOPLE THINK





Image source: Shutterstock.com



Image source: Shutterstock.com



Image source: pexels.com, credit Vanessa Loring

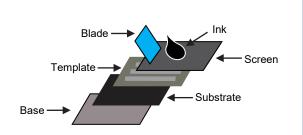
HYBRID MANUFACTURING OF ELECTRONICS

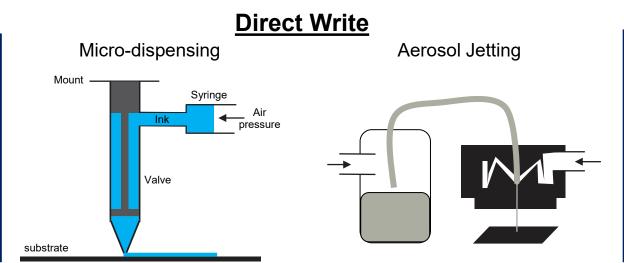


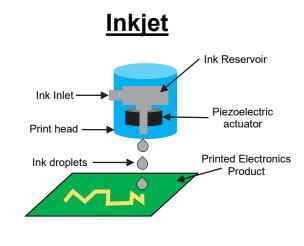


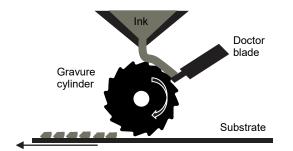
• **Printed electronics** are functional electronic devices or components that were created through an additive process or multiple additive processes. Some of these enable conformal shape printing.

Screen Printing



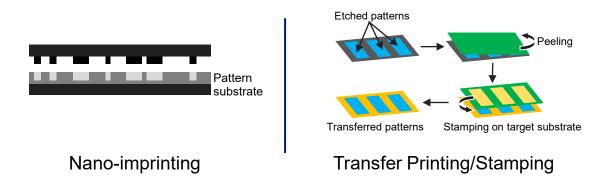


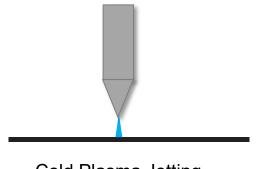




Gravure & Gravure Offset

Others





Cold Plasma Jetting

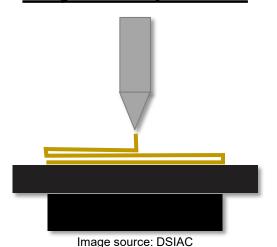
APPROVED FOR PUBLIC RELEASE

HYBRID MANUFACTURING OF ELECTRONICS SUPPORTING MFG.





Polymer Deposition



Micro-milling

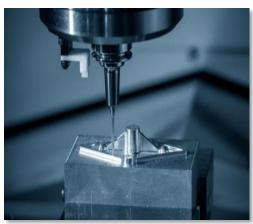


Image source: Shutterstock.com

Laser-Etching



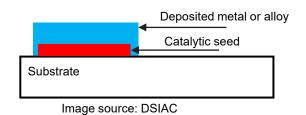
Image source: Courtesy laserax.com

Robotics/Automation

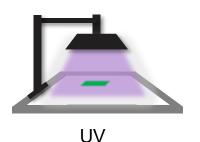


Credit: National Center for Advancing Translational Sciences (https://www.flickr.com/photos/64860478@N05/5964663403)

Electro-/Electroless Plating



Curing/Sintering





Thermal

MINDSET



Cool tech to use, the future is now AM can sidestep your supply chain issue.

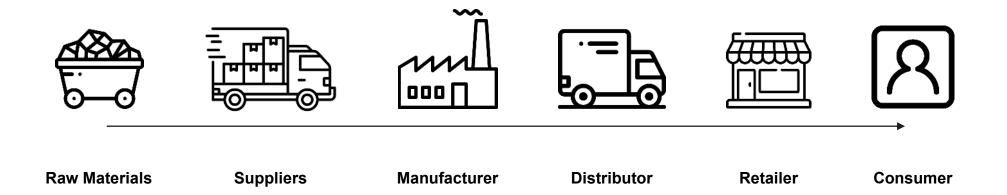


Image source: flaticon.com

PROMOTE BENEFITS OF AM



- Cost some applications may be cheaper to 3D print, especially for production runs.
- SWAP (Size, Weight, and Power) Can be optimized.
 - Topology, strength, heat exchange, etc.
- Unique Designs Designs that can't be made traditionally.
 - Think internal curved fluidic passages inside a metal block that couldn't be machined out.
- Reduce Part Count Combine multiple parts into one.
 - -One 3D printed waveguide vs. five waveguides for a system.
- Reduced Time Print parts when you need them as a stop-gap solution to improve readiness.
- Broader Industrial Base and Alternate Solutions Access to multiple options to meet unique and unexpected needs.

DOING BUSINESS WITH THE DOD



Identify your Product or

Register your Business

Learn about

Search
Current DoD
Procurement
Opportunities

Get More Assistance

 Know the Product Service Codes (PSCs) and the North American Industry Classification System (NAICS) codes for your products, services or industry in which your organization normally does business

· NavalX Launch Platforms, Navy Demo Days

Service

- Obtain a Data Universal Numbering System (<u>DUNS</u>*) number
- Register in the System for Award Management (SAM)
- Obtain a Commercial and Government Entity (<u>CAGE</u>) code for U.S. businesses.

fewer than 500 employees, depending upon your industry. Special preferences and programs are available for small businesses to contract with the government. Use SBA's <u>Size Standard tool</u> to determine if your business is eligible.

Generally, small businesses have

Small Business

Programs

- U.S. Small Business Administration (SBA)
- •DoD's Office of Small Business Programs
- •DoD's <u>Small Business and</u> <u>Technology Partnerships Office</u>

- Visit <u>SAM.gov</u>
- •Investigate Federal Supply Schedules
- Explore FedMall Contracts
- Look for subcontracting opportunities on the SBA's <u>SUB-</u> Net
- •Look at the <u>GSA Acquisition</u> <u>Gateway</u>
- Explore the Other Transactions
 Guide

- Review SBA's <u>Federal</u> <u>Contracting Guide</u>
- Locate a <u>DoD Small Business</u>
 Specialist
- Contact your local <u>Procurement Technical</u> Assistance Center
- Contact your <u>local</u>
 Manufacturing Extension
 Partnership office

Research & Development Funding Opportunities

- · Air Force Research Lab and their funding opportunities
- · Army Research Office and their funding opportunities
- · Office of Naval Research and their funding opportunities
- Basic Research Office Forum
- Defense Threat Reduction Agency (DTRA) and business opportunities
- Defense Advanced Research Projects Agency (<u>DARPA</u>) and their <u>business</u> opportunities
- · Grants.gov and DoD Opportunities

Need More Details on the Contracting Process?

- A Step-By-Step
 Approach to the DoD

 Marketplace
- <u>Defense Federal</u>
 <u>Acquisition Regulation</u>
 Supplement

Innovate with DoD

Attend an Event

· Air Force Pitch Days

Meet a Technology Expert

Centers of Excellence*

· Air Force Office of Scientific Research

Navy's ManTech Centers of Excellence

· National Security Innovation Network

Manufacturing Innovations Institutes

Army xTechSearch

- AFWERX
- · Army Applications Laboratory
- NavalX and Tech Bridges
- Defense Innovation Unit

*Denotes non-governmental entity. The appearance of hyperlinks does not constitute endorsement by the Department of Defense of any non-U.S. government entity, its websites or the information, products, or services contained therein. Although the Department of Defense may or may not use these sites as additional distribution channels for Department of Defense information, it does not exercise editorial control over all of the information that you may find at these locations. Such links are provided consistent with the stated purpose of this document.

www.businessdefense.gov/docs/resources/Doing-Business-with-DoD-Feb_2022.pdf

CONCLUSIONS



- DMSMS poses significant risk to sustainment of systems.
- This interdisciplinary problem offers opportunities to create an environment of solutions.
- AM introduces diversity and flexibility into DMSMS solutions.

OPEN DISCUSSION



Questions & Answers

Ask any questions you may have