Navigating Department of Defense Additive Manufacturing Acquisition Practices

Naval Postgraduate School

Abstract

This research explored policies, processes, organizational alignment, and data management to assess additive manufacturing (AM) acquisition in the Air Force. We consolidate our findings to develop recommendations that DOD customers can use when seeking 3D-printed requirements. Our conclusion highlights strengths and weaknesses of current acquisitions processes and provides recommendations for further research. While Air Force-centric, our research findings can be adopted to fit acquisition needs specific to all DOD services seeking to meet the call for improved contracting processes outlined in the *Department of Defense Additive Manufacturing Strategy*.

Xerox ElemX 3D Liquid Metal Printer on NPS campus.

Source: nps.edu; NPS & Xerox CRADA

Research Questions

- How well do Air Force AM acquisition practices meet the GAO (2005) *Framework for Assessing the Acquisition Function at Federal Agencies*?
- What are the strengths and weaknesses of Air Force's AM acquisition practices?
- How is the Air Force purchasing AM compared to other DOD agencies?
- What are the best acquisition practices within the Air Force's additive manufacturing landscape?

Methods

- Apply GAO framework to assess AM acquisitions within the Air Force in the areas of policy, processes, organizational alignment, and data management
- Conduct stakeholder interviews
- Conduct spend analysis using federal procurement data to compare Air Force, Navy, and Army AM purchases

Results & Their Impact

The Air Force closely aligns AM acquisition practices with the vision and strategy established by the *Department of Defense's Additive Manufacturing Strategy*, and is working to improve its policies, processes, and data and intelligence management. However, more time and testing is needed for increased AM adoption in the operational, expeditionary, and weapon system environments.

Air Force AM Acquisition Best Practices. Assessed using GAO (2005) Framework.

Cornerstone	Element	Best Practices
Organizational Alignment and Leadership	1. Aligning Acquisition with Agency's Mission and Needs	• Strategic alignment with JAMWG • AM Business Model Wargames
	2. Commitment from Leadership	• Additive Manufacturing Marketplace • AM Contracting Guidebook • Strong representation at Military AM Summit
	3. Change Management	• CRADAs and partnerships • Exploration of AM category management
Policies and Processes	1. Planning Strategically	• Identifying a governing body for AM related questions and decisions early in the process • Collaboration with industry and academia
	2. Effectively Managing the Acquisition Process	• Empowering experts and members of cross-functional teams • Flexibility in acquisition methods
	3. Promoting Successful Outcomes of Major Projects	• Ability to use FAR and non-FAR based acquisition methods depending on the requirement • Working with industry and academia in identifying AM capability gaps
Data and Intelligence Management	1. Data Integrity	• Identifying a governing body for AM related questions and decisions early in the process
	2. Data Analysis	• Empowering experts and members of cross-functional teams

Recommendations

- Simplify PSC codes & align them with common categories of spend
- Develop new PSCs tailored toward AM
- Implement stricter FPDS-NG requirements (i.e., 3D Printer Models)
- Conduct a category intelligence report on AM
- Adopt common categories of AM spend within Category 5
- Publish guidance on acquisition roles and responsibilities
- Create a digital support forum (e.g., MITRE's AM Marketplace)
- Develop guide to standardize inputs for AM procurement data

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