

**Acquisition Research Program (ARP)  
Application  
Graduate Student Research**

**Graduation Date: 27 March 2020**

**Research Team Members:**

Name	Program	Graduation	Rank	Service	Country
Brock Zimmerman	816	March 2020	MAJ	USA	USA
Ellis Allen	816	March 2020	CPT	USA	USA

**Faculty Advisors:**

Name	Advisor Role
Bryan J. Hudgens	Lead Advisor
Dr. Douglas E. Brinkley	Support Advisor

**I. Project Descriptive Information:**

**Project Title:** Analysis of the Potential Impact of Additive Manufacturing on Army Logistics

**Project Topic/Subject:** The purpose of this research is to examine additive manufacturing and describe the potential impact it could have on Army logistics. Army standard operating procedures for logistics will be examined to identify potential benefits, costs and risks that could be realized as a result of incorporating 3D printing technology. Our methodology will include examining companies that have incorporated 3D printing into their operations and identifying any benefits realized. A comparative analysis will identify how 3D printing technology could affect Army logistics operations in theater. In the conclusion of this project we will identify the pros and cons of the processes and provide recommendations for further research on other potential applications.

**Project Objectives:**

- a. Identify operations of industries that have incorporated additive manufacturing
- b. Outline process before and after implementation
- c. Determine the effectiveness of operations post implementation
- d. Outline standard Army logistics operations
- e. Model potential operations incorporating additive manufacturing
- f. Identify potential advantages/disadvantages

**Background:** Additive manufacturing technology has been steadily evolving for nearly three decades. As the technology improves, and price goes down, more industries are incorporating it into their operations. In a deployed environment, the U.S. Army relies heavily on supply chain management to conduct operations. However, with rapid acquisition of equipment in recent years, users often identify problems associated with equipment post- deployment. In the event of failure of parts that are not a part of the authorized stockage list (ASL), deployed units will have to order parts

and have them shipped from the United States. Additive manufacturing could provide the Army with the ability to produce or modify parts in the deployed environment.

## II. Activities Expected for Project Completion

**Problem Identification:** For more than ten years the U.S. Army has been conducting operations in Iraq and Afghanistan. Continuous operations have taken a toll on already aging equipment. Coupled with the fielding of equipment through rapid acquisition, there is an increasing requirement for parts. The requirement of parts from resupply points or shipped from the U.S. increases downtime and reduces readiness.

**Appropriate Data:** We will need to clearly describe processes utilized by different industries before and after incorporating additive manufacturing. Next, we will need to describe Army supply chain management in theater. Finally, we will apply lessons learned in industry to the Army's model and describe potential benefits additive manufacturing may provide.

### Appropriate Analysis:

- a. Evaluate the processes before and after additive manufacturing in industry
- b. Assess advantages and disadvantages
- c. Apply to Army logistics operations
- d. Determine/assess the potential benefits additive manufacturing may provide

### Accomplishments:

- a. Summarize the state of knowledge of additive manufacturing.
- b. Clearly identify the major considerations for/against incorporating additive manufacturing in the future.
- c. Provide recommendation for procedural changes if implemented.
- d. Provide recommendation for organizational changes to facilitate incorporation.

## III. Roles of Participants:

- **Students:** Click or tap here to enter text.
- **Faculty Advisors:** Faculty advisors will provide applicable insight and guidance throughout the project, including:
  1. Review draft documents
  2. Recommend research sources and methodologies
  3. Evaluate final project

**IV. Proposed Project Schedule:** The required ARP milestones are outlined below. Please add additional date or revise the date for each milestone, as needed.

- **25 Aug 2019** – Submit ARP Application
- **11 Oct 2019** – Complete Travel
- **1 Nov 2019** – Complete Data Collection
- **13 Dec 2019** – Submit First 3 Chapters for Edit Review to ARP through TaskIt

- **15 Jan 2020** – Submit All Chapters for Edit Review to ARP through TaskIt
- **10 Feb 2020** – Submit Final Results Poster to ARP through TaskIt
- **2 Mar 2020** – Submit Final Research Report to ARP through TaskIt

## V. Other

- **References:**
- **Report Classification and Distribution:** Approved for public release; distribution is unlimited. If this is not the case, please comment: [Click or tap here to enter text.](#)
- **Interviews/Survey:** Will you be conducting interviews or using a survey to complete your research? If yes, please comment on your plan (who, what, when, where and how). [Click or tap here to enter text.](#)
- **Transcription:** If applicable, please estimate the number of recorded hours that will need to be transcribed. [Click or tap here to enter text.](#)

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**Total Travel Budget Requested** (all DTS estimates) \*: [Click or tap here to enter text.](#)

**Travel Details** (who, what, when, where and how): [Click or tap here to enter text.](#)

**Travel Justification** (why): [Click or tap here to enter text.](#)

\* *Attach All DTS estimations for all team members to this application*

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**Advisor Endorsements:** Advisors please review, comment and sign.

1. Do you anticipate that the final research report to be as Public Release, with Unlimited Distribution? [Click or tap here to enter text.](#) If no, please comment: [Click or tap here to enter text.](#)
2. Do you think the travel funding is appropriate for the research scope and effort involved? [Click or tap here to enter text.](#) If no, please comment: [Click or tap here to enter text.](#)
3. Do you considered the travel details identified in this application to be mission critical? [Click or tap here to enter text.](#) Please comment (why). [Click or tap here to enter text.](#)

### **Acknowledge:**

As the advisor, I believe that this project is compliant with NPS Institutional Review Board (IRB) requirements related to Protection of Human Subjects.

I know that this research project is being considered for acceptance and travel funding through the Acquisition Research Program and understand that the research team is required to stay on schedule and meet ARP milestones as outline above. I recommend this research team and project to the ARP.

**Advisor Signatures:**

X

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Advisor

X

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Advisor

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