SYM-AM-21-101



EXCERPT FROM THE PROCEEDINGS of the Eighteenth Annual Acquisition Research Symposium

Aligning DoD Program Management Competencies with the Project Management Institute Standards

May 11-13, 2021

Published: May 10, 2021

Approved for public release; distribution is unlimited.

Prepared for the Naval Postgraduate School, Monterey, CA 93943.

Disclaimer: The views represented in this report are those of the author and do not reflect the official policy position of the Navy, the Department of Defense, or the federal government.



The research presented in this report was supported by the Acquisition Research Program of the Graduate School of Defense Management at the Naval Postgraduate School.

To request defense acquisition research, to become a research sponsor, or to print additional copies of reports, please contact any of the staff listed on the Acquisition Research Program website (www.acquisitionresearch.net).



Aligning DoD Program Management Competencies with the Project Management Institute Standards

Dr. Robert F. Mortlock, COL, USA (Ret.), is a professor of the practice for defense acquisition and program management in the Graduate School of Defense Management at the Naval Postgraduate School in Monterey, CA. He holds a PhD in chemical engineering from the University of California, Berkeley, an MBA from Webster University, an MS in national resource strategy from ICAF, and a BS in chemical engineering from Lehigh University. [rfmortlo@nps.edu]

Jonathan L. Karnes, 1st Lt, USAF, is a contracts specialist for the Air Force Life Cycle Management Center's Medium Altitude Unmanned Aircraft System Division. He holds an MBA in acquisition management from the Naval Postgraduate School, an MBA in project management from the University of Texas at San Antonio, and a BS in communication studies from the University of Texas at Austin. [jonathan.karnes.3@us.af.mil]

Abstract

In 1990, the Government Accountability Office began publishing their high-risk series meant to review federal programs prone to waste, abuse, and mismanagement. Defense acquisitions has appeared in every high-risk list's publication due to the tendency to miss cost, schedule, and performance objectives. In 2019, Congress passed the National Defense Authorization Act, which mandated every acquisition career field to realign their certification requirements to be based on the nationally recognized standards of an accredited third party. This study offers recommendations for improving the DoD program management (PM) training standards by providing traceability between the DoD PM competencies and the Project Management Institute's standards for project, program, and portfolio management. The study elaborates on the extent of alignment, finding that 96% of the DoD PM competency elements align to PMI standards. Areas of misalignment identify opportunities to augment DoD PM training and highlight areas where DoD PM training deviates from industry standards.

Keywords: project management, program management, portfolio management, Defense acquisitions, functional career field competencies, training, industry standards

Introduction

For decades, the Department of Defense (DoD) has been criticized for its inability to manage the various programs funded by the U.S. taxpayers. These repeated failings in the realms of program cost, schedule, and performance have been documented in numerous reports from the Office of the Secretary of Defense and the Government Accountability Office (GAO) and in a myriad of theses and dissertations (Bond et al., 2016; Choi, 2009; H.R. 5211, 1990; GAO, 2019a, 2019b; Kupec, 2013; Pernin et al., 2012; President's Blue Ribbon Commission on Defense Management, 1986; Redshaw, 2011). A debate continues as to whether the acquisition program failings are caused by the DoD's inherently complex acquisition system or the quality of its acquisition personnel. In an article entitled, "Does the Program Manager Matter? New Public Management and Defense Acquisition," the authors claim that until the acquisitions system and processes of the DoD are fixed, the training and education of program managers (PMs) could be considered inconsequential to the success of defense programs (Eckerd & Snider, 2017). However, based on the recommendations in GAO-18-217, which was focused on improving program management, the DoD's program performance would improve if the DoD would "improve practices that do not align extensively with leading practices" (GAO, 2018a, "GAO Highlights" section). This recommendation is further supported by the GAO's annual high-risk list, which lists the



DoD career fields that pose a great level of risk to the government if not improved upon or appropriately monitored. DoD weapon systems acquisition has consistently been included on this list since 1990 (GAO, 1995, 2019a). According to the most recent list developed in 2019, DoD program management was considered high risk because of the anticipated \$1.66 trillion investments into their acquisition and procurement portfolio (GAO, 2019a). After decades of continuous defense acquisition reform initiatives, there is still no effort guaranteed to resolve the continued shortfalls in meeting cost, schedule, and performance goals for acquisition programs (GAO, 2019a). These three factors are commonly referred to as a program's triple constraint and form the acquisition program baseline for management.

While the DoD has struggled to develop solutions meant to resolve their continued issues with meeting their program's planned cost, schedule, and performance baselines, the DoD has made attempts. One such attempt was implemented under President Reagan's administration. A group of acquisition professionals were assembled under the leadership of David Packard to form President Reagan's Blue Ribbon Commission, also commonly referred to as the Packard Commission. This commission provided a series of recommendations that are still being implemented today. As it pertains to this research study, the Packard Commission's most relevant recommendation was to require business-related education and training for acquisition personnel (President's Blue Ribbon Commission on Defense Management, 1986).

This recommendation led to the passing of the Defense Acquisition Workforce Improvement Act (DAWIA) of 1990, which then led to the establishment of the Defense Acquisition University (DAU). Since its inception in 1991, the DAU has structured its acquisition curriculum in a way that would best prepare PMs to maneuver the complexities of the defense acquisition system, which consists of the interoperation of management processes (the Adaptive Acquisition Framework), requirements processes (like the Joint Capabilities Integration and Development System [JCIDS] for formal programs of record), and a resourcing process (referred to as the planning, programming, budget, and execution [PPBE] system; Office of the Under Secretary of Defense for Acquisition & Sustainment [OUSD(A&S)], 2020a, 2020b). In 2016, the Office of the Assistant Secretary of Defense for Acquisition distributed the functional career field competencies for PMs and broke them down into the following DoD PM categories: Acquisition Management, Business Management, Technical Management, and Executive Leadership (MacStravic, 2016). From the DoD's perspective, these competencies serve as the standards that enable PMs to effectively "deliver missioncritical capabilities in terms of equipment and services" (MacStravic, 2016, p. 2). Furthermore, this list of competencies serves as the basis for the program management (PM) DAWIA certification standards adopted by the services.

The Project Management Institute (PMI) is an independent, private organization that has led the way in establishing the internationally recognized standards for project management, program management, and portfolio management across industries. They offer a variety of certifications to business and management professionals that are recognized globally. Since 1999, the American National Standards Institute (ANSI) has approved PMI's *Guide to the Project Management Body of Knowledge*® (*PMBOK Guide*; PMI, 2017a) as the American national standard for project management (Holtzman, 1999). A contributing factor to the *PMBOK Guide* being ANSI-certified is its wide range of applicability across industries. No matter what industry one is in, the knowledge areas discussed in the PMI's *PMBOK Guide* and the performance domains of *The Standard for*



Program Management (*TSPgM*; PMI, 2017c) and *The Standard for Portfolio Management* (*TSPfM*; PMI, 2017b) apply.

In December 2019, Congress passed the National Defense Authorization Act for Fiscal Year 2020 (NDAA). The section of this act that is relevant to this research is Section 861, "Defense Acquisition Workforce Certification, Education, and Career Fields" subsection (c), "Professional Certification." It states,

The Secretary of Defense shall implement a certification program to provide for a professional certification requirement for all members of the acquisition workforce. ... The certification requirement for any acquisition workforce career field shall be based on standards developed by a thirdparty accredited program based on nationally or internationally recognized standards. (NDAA, 2019)

This subsection has mandated a refocusing of how the DoD trains its acquisition professionals. Per the NDAA, it is the role of the Office of the Secretary of Defense to produce the realigned certification program based on nationally or internationally recognized standards of an accredited third party (NDAA, 2019). Per the DAWIA (H.R. 5211, 1990), it is the DAU's role to provide the training that meets the requirements of the acquisition workforce.

The purpose of this research is to understand the extent to which the DoD's PM functional career field competencies currently align with the internationally recognized standards for project, program, and portfolio management published by the PMI. This research will be used to make recommendations to the DoD on how to best transition from its current PM certification requirements to certification requirements based on the PMI standards. This study answers the following research questions:

- To what extent are the DoD's program management competency elements at the basic, intermediate, and advanced DAWIA levels aligned with the PMI's *PMBOK Guide*, *TSPgM*, and *TSPfM*?
- To what extent are the knowledge areas and performance domains in the PMI's *PMBOK Guide*, *TSPgM*, and *TSPfM* aligned with the DoD's program management competency elements at the basic, intermediate, and advanced DAWIA levels?

The results of this study provide insight and recommendations for the decisionmakers within the Office of the Secretary of Defense (OSD) and the DAU charged with realigning the program management professional certification. This will enable them to make informed decisions on carrying out the modifications to the program management certification requirements as mandated by the NDAA.

This research focuses on the shift in the basis for DoD program management certification requirements. Specifically, this study pertains to the alignment of the DoD's program management functional career field competencies (MacStravic, 2016) to the PMI's 10 knowledge areas that comprise the *PMBOK Guide* (PMI, 2017a), the program management performance domains of *TSPgM* (PMI, 2017c), and the portfolio management performance domains of *TSPfM* (PMI, 2017b). This study provides traceability between the DoD program management competencies and the industry standards and elaborates on the extent to which they are aligned. Finally, this study highlights areas of inconsistency and results in recommendations for changes in DoD standards for training and education and potential policy changes.



Literature Review

The study of PM career field competencies can be linked to work in other acquisition workforce career fields. Rendon (2019) states that it is important to make an organization auditable so it is better suited to achieve its mission goals and objectives. The concept of auditability consists of three main components: capable processes, effective internal controls, and competent personnel. The DoD has robust processes within defense acquisition in the form of acquisition management framework, requirements, and resourcing processes. The DoD also has internal controls provided by the GAO, the DoD's Office of Inspector General (DoD IG), congressional oversight, and adherence laws such as annual NDAAs and acquisition acts like the Nunn–McCurdy Act (Schwartz, 2010). This research aids the DoD in improving upon the third component of auditability: competent personnel.

As previously discussed, defense acquisitions have been criticized for failing to meet cost, schedule, and performance program baseline objectives. In response to the deficiencies in these three areas, the DoD has implemented multiple acquisition reform initiatives to improve its processes. The reform initiatives have also modified the acquisition reporting structure and used the power of government watchdogs such as the GAO and the DoD IG to implement effective internal controls. To improve the quality of its acquisition professionals, the DoD has made frequent modifications to the training and education requirements. This literature review covers former acquisition reform initiatives, external findings on DoD acquisition performance, the standards published by the PMI, and scholarly articles that express support and opposition to modifying the alignment of the DoD competencies to the standards of a third party.

In 1985, the Reagan administration appointed former U.S. Secretary of Defense David Packard to lead its Blue Ribbon Commission, which was established to make recommendations on how to improve defense acquisitions. The output of the Packard Commission resulted in nine recommendations; the one addressed in this research study is the recommendation to enhance the quality of acquisition personnel (President's Blue Ribbon Commission on Defense Management, 1986). This recommendation focused on improving the appointment criteria of senior-level personnel to more effectively run programs and portfolios and called for business-related education for civilians and for federal law to allow acquisition personnel to pursue expanded opportunities for education and training (President's Blue Ribbon Commission on Defense Management, 1986). This recommendation was implemented via the passing of the DAWIA in 1990. The DAWIA (H.R. 5211, 1990) resulted in the development of the DAU and the establishment of baseline training requirements for acquisition professionals.

The DAU is the primary source of training for defense acquisition professionals. The DAU provides formal courses as well as continuous learning to promote continuing education and professional growth for thousands of students every year (Woolsey, 2019). To date, these courses are structured to accommodate DAWIA certification requirements and have been broken down into three levels (DoD & DAU, n.d.):

- Level I: basic or entry level
- Level II: intermediate or journeyman level
- Level III: advanced or senior level (DoD & DAU, n.d.)

The content of the training requirements for PMs is based on the DoD PM functional career field competencies, which make up four overarching PM categories



that serve as the basis for developing the learning objectives and training materials for PMs (MacStravic, 2016):

- Acquisition Management
- Business Management
- Technical Management
- Executive Leadership (Level III education for unique positions)

In November 2019, the NDAA directed the Secretary of Defense to implement a certification program based on standards developed by a third party (NDAA, 2019). For the DoD's PM training curriculum, this requires adjusting the training standards from being based solely on DoD unique functional career field competencies to instead being founded on the "standards developed by a third-party accredited program based on nationally or internationally recognized standards" (NDAA, 2019, p. 778). This shift from DoD-centric competencies to the widely accepted standards of the private sector is an attempt to improve the quality of defense acquisition personnel by making them more capable to work with industry partners throughout the acquisition process.

Defense acquisition management has been on the GAO's high-risk list since 1990 because of the failure in meeting the five criteria for removal: leadership commitment, capacity, action plan, monitoring, and demonstrated progress (GAO, 2019b). Of those five, defense acquisition management meets the criteria for leadership commitment but only partially meets the other four. This continued pattern of insufficiency makes the DoD vulnerable to budget overruns, schedule slips, and underperformance—observed in major defense acquisition programs like the F-35 Joint Strike Fighter (GAO, 2018b) and the Army Future Combat Systems (Pernin et al., 2012). The poor returns on investment exhibited by these and other programs have led to the acquisition management career field remaining on the high-risk list (GAO, 2019b) and have created a continual demand for acquisition reform (Gansler et al., 2007).

While there is generally consensus among lawmakers and DoD senior leaders that there is room for improvement in how the DoD manages programs, there are different thoughts on how the DoD should work to improve the acquisition career field. Multiple GAO reports have contradicting views on what needs to change to remove defense acquisition from the high-risk list. Some reports recognize that the certification training offered by the DAU is capable of providing adequate training to PMs (GAO, 2010), whereas others state that the issues emanate from those very same training standards not aligning with leading practices (GAO, 2018a). The takeaway is that the DAU has the infrastructure and organizational alignment to provide effective training, but the current training can be more effective if aligned with more widely accepted standards. This issue could be addressed by incorporating the advisement provided by the GAO to the Office of Management and Budget (OMB) by adopting "an existing set of consensus-based standards, such as the widely accepted standards for program and project management from the Project Management Institute" (GAO, 2019a, p. 11).

The PMI is a not-for-profit association that publishes standards for certification programs including the PMP, the PgMP, and the PfMP. Earning these credentials certifies that one is qualified to lead a project, manage a program, and meet strategic objectives in overseeing one or more portfolios, respectively (PMI, 2020). The PMI certifications are recognized globally due to their widely applicable and highly detailed standards that have proven over time to improve the outcomes of projects, programs, and portfolios if applied and resourced appropriately.



In 1999, the ANSI first approved the PMI's *PMBOK Guide* (PMI, 2017a) as the American national standard for project management (Holtzman, 1999). PMI also awards the project management professional (PMP) credential. This credential is ideal for individuals who lead and manage projects, which the PMI defines as "temporary endeavors undertaken to create a unique product, service or result" (PMI, 2017a, p. 4).

The *PMBOK Guide* is broken down into 10 knowledge areas, which are made up of 49 processes. Project management knowledge areas are categorized by their knowledge requirements and are described in terms of their various component processes, practices, inputs, outputs, tools, and techniques (PMI, 2017a). Project management processes are defined as "systematic activities directed toward causing an end result where one or more inputs will be acted upon to create one or more outputs" (PMI, 2017a, p. 18). Figure 1 includes a complete list of the 49 processes that fall under the 10 different knowledge areas in the *PMBOK Guide* (PMI, 2017a).

		Project M	anagement Proce	ess Groups	
Knowledge Areas	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Figure 1. Ten Knowledge Areas of the *PMBOK Guide* (PMI, 2017a)



ACQUISITION RESEARCH PROGRAM Graduate School of Defense Management Naval Postgraduate School The program management professional (PgMP) certification is based on *The Standard for Program Management (TSPgM*; PMI, 2017c). The purpose of *TSPgM* is to provide generally recognized guidance to support good program management practices, establish a common understanding of the role of a PM, and offer guidance for PMs' interactions with portfolio and project managers as well as any other program stakeholders (PMI, 2017c). According to the PMI, a program is made up of "related projects, subsidiary programs, and program activities managed in a coordinated manner" (PMI, 2017c, p. 3). When programs are run effectively, they can deliver benefits that would not have been attainable had their subsidiary programs and projects been managed independently.

Similar to the *PMBOK Guide* (PMI, 2017a), *TSPgM* discusses five performance domains that are "complementary groupings of related areas of activity or function that uniquely characterize and differentiate the activities found in one performance domain from the others within the full scope of program management work" (PMI, 2017c, p. 23). The purpose of these domains is to provide PMs with a general checklist of tasks and concepts to complete and consider throughout the life of the program (refer to Figure 2).

The portfolio management professional (PfMP) certification is based on *The Standard for Portfolio Management (TSPfM*; PMI, 2017b), the purpose of which is to provide portfolio management principles and performance management domains that are considered to be good practices for organizations that manage complex programs and projects. *TSPfM* provides a common understanding of the role of a portfolio manager as well as a unified vocabulary to use across industries (PMI, 2017b). According to the PMI, "a portfolio is a collection of projects, programs and subsidiary portfolios and operations managed as a group to achieve strategic objectives" (PMI, 2017b, p. 3). The purpose of managing a portfolio versus independent programs and projects is to achieve organizational objectives and strategies that could not be met otherwise.

TSPfM is very similar to *TSPgM* in that it consists of seven performance domains and is supported by the *PMBOK Guide*. These seven performance domains, when followed and executed correctly, are what allow for the portfolio management plan to achieve its desired impact on strategy and performance (PMI, 2017b). For a complete list of these domains and what items are associated with them, see Figure 3.





Figure 2. Program Management Professional Performance Domains

Figure 3. Portfolio Management Professional Performance Domains



ACQUISITION RESEARCH PROGRAM Graduate School of Defense Management Naval Postgraduate School

(PMI, 2017c)

(PMI, 2017b)

In the early 2000s, the DoD worked with the PMI to develop the *U.S. Department* of Defense Extension to: A Guide to the PMBOK (PMBOK Guide; DoD & DAU, 2003). The purpose of the DoD and PMI collaboration was to identify defense applications of the PMBOK Guide's knowledge areas and to meet the objective of the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD[AT&L]) to build credibility in acquisitions by delivering systems at lower cost and on schedule (DoD & DAU, 2003). However, the PMBOK Guide's extension was never implemented into the DAU certification curriculum (Kupec, 2013).

It has been well established that DoD acquisition programs have struggled to effectively manage program cost, schedule, and performance (GAO 2018a, 2018b, 2019a). The NDAA (2019) addresses this issue by mandating that the DAU modify its existing certification requirements to be based on the standards of an accredited third party with nationally recognized standards. Because of the high visibility of defense acquisitions, there have been many scholarly studies on how the DoD could improve their training standards by mirroring an entity like the PMI (Choi, 2009; Kupec, 2013; Redshaw, 2011). In comparison to the progressive complexity of PMI's certifications for project, program, and portfolio management, the DAWIA certifications for Level I (basic), Level II (intermediate), and Level III (advanced) "correlate to the complexity and responsibilities required for designated positions and different types of assignments in weapon systems, services, business management systems and information technology, and international acquisitions" (Redshaw, 2011, p. 55). Both Choi (2009) and Kupec (2013) concur with this analysis and elaborate further that modeling the new DAU standards after only one of the PMI credentialing standards—PMP for example—would not be sufficient. Individuals who earn the PMP credential have proven themselves to be capable of effectively leading project teams and managing a temporary project. While this credential holds value in the program management industry, the body of knowledge that accompanies it would not be enough to equip an individual to run a complex decade-long program or portfolio. For these reasons, it is essential to base the new DAWIA certification requirements on all three of the PMI credentials.

According to auditability theory, in order for an organization, project team, program office, or portfolio executive officer to meet their specific objectives, it is critical that competent personnel are employed, effective internal controls are maintained, and capable processes are implemented (Rendon & Rendon, 2015). As it relates to defense acquisition reform, there are divergent opinions as to which of the three components of auditability should be focused on to improve program metrics in cost, schedule, and performance. For example, Eckerd and Snider (2017) claim that the defense acquisition processes should be the focal point for reform due to their complexities. They add that the environmental politics that DoD PMs maneuver daily prevent them from being effective, which nullifies any quality training they undergo. Other research comes to a similar conclusion that in order to make significant changes in federal acquisitions. acquisition reform needs to comprehensively consider changes to the management processes (acquisition framework), the resources processes (PPBE system), and the requirements processes (Bond et al., 2016). Mortlock (2020) asserts that providing DoD PMs with professional-level training and adopting internationally recognized industry standards (for example, PMP, PgMP, and PfPM certifications) could help improve the effectiveness of PMs, help gain acceptance for program management as a profession, and help solidify the credibility of the defense acquisition workforce.



METHODOLOGY

This research involved a qualitative, lexicographic analysis of the descriptions of the DoD's program management competencies and the descriptions of the PMI's knowledge areas and domains in the *PMBOK Guide* (PMI, 2017a), *TSPgM* (PMI, 2017c), *TSPfM* (PMI, 2017b), the NDAA for Fiscal Year 2020 (NDAA, 2019), and other key sources. This highlighted key words, phrases, and meaning from the description of each knowledge area, domain, and competency and allowed for an informed mapping of the DoD's PM competencies to the PMI's standards.

The OUSD(AT&L) memorandum entitled *Program Management Functional Career Field Competencies* served as the primary DoD source used in analyzing the alignment between the DoD's program management competencies and the PMI's standards (MacStravic, 2016). According to the memorandum, an integrated product team developed the updated competencies while considering the three certification levels: Level I (basic), Level II (intermediate), and Level III (advanced; MacStravic, 2016). The memorandum includes the following information used in this research:

1. **Program Management Competency Units and Competencies:** The PM competencies are organized into the four program management categories and 18 units of competency. Figure 4 demonstrates the distribution of the competencies.

Acquisit Manager	Technical Management			
Capability Integration Planning	Program Execution	Engineering Management		
Requirements Management (Mgmt)	Risk/Opportunity Mgmt	Technical Planning		
Acquisition Program Strategic Planning	Program Planning	Requirements Decomposition		
Business Case Development	Teaming	Technical Assessment		
Acquisition Law and Policy	Program Oversight	Decision Analysis		
Acquisition Policy and Best Practice	Resource Mgmt	Configuration Mgmt		
Contractual Laws, Regulations, and Obligations	Technology Mgmt	Technical Data Mgmt		
Financial Mgmt Laws, Directives, and Policies	Services Acquisition	Interface Mgmt		
Program Support Laws, Directives, and Policies	Business Management	Defense Business Systems		
Technical and Engineering Laws, Directives and Policies	Contract Management	DBS Certification		
Information Technology Laws, Policy, Best Practices	Market Research	DBS Acquisition Approach Preparation		
International Acquisition and Exportability	Pre-Solicitation Planning and Execution	Test and Evaluation Mgmt		
International Cooperative Programs	Source Selection and Negotiations	Test Planning		
Sales and Transfers	Contract Administration	Test Execution		
Technology Security and Foreign Disclosure	Contract Closeout	Manufacturing Mgmt		
Defense Exportability Integration	Financial Mgmt	Manufacturing Planning and Transition		
	Financial Planning	Manufacturing Shutdown		
Stakeholder Mgmt	Programming	Product Support Mgmt		
Political Savvy	Budget Formulation	Product Support Planning		
External Situational Awareness	Budget Execution	Product Support Mgmt		
Media Relationships	Cost estimates	Supply Chain Mgmt		
	Executive Leadership			
Foundational Competencies	Leading Change	Results Driven		
Interpersonal Skills	Creativity & Innovation	Accountability		
Integrity / Honesty	Vision	Decisiveness		
Communicate Effectively	Flexibility	Entrepreneurship		
Continual Learning	Resilience	Customer Service		
Public Service Motivation	Leading People	Problem Solving		
Technical Credibility	Conflict Management			
Building Coalitions	Leveraging Diversity			
Influencing / Negotiating	Developing Others			
Partnering	Team Building			

Figure 4. DoD Program Management Competency Units and Competencies (MacStravic, 2016)



2. **Program Management Functional Career Field Competencies:** Descriptions of the 70 competencies are provided for each of the three DAU certification levels.

The data sources used from the PMI include the *PMBOK Guide*, *TSPgM*, and *TSPfM*. Although the *PMBOK Guide* is the only ANSI-accredited standard, the contents of *TSPgM* and *TSPfM* are recognized internationally and accepted industry practices for program and portfolio managers, respectively. *TSPgM* and *TSPfM* define the standards for the application of their principles and practices, which enhances the likelihood of program and portfolio success (PMI, 2017b, 2017c). The PMI standards were mapped to each of the 190 elements at the basic, intermediate, and advanced level (570 total element descriptions). PMI conference papers served as the primary source for additional information on PMI standards (Alie, 2016; Ross & Shaltry, 2006; Shenhar & Dvir, 2004).

This research required the qualitative analysis of data—the data being the DoD's PM competency descriptions and the contents of the PMI's knowledge areas and performance management domains, and the qualitative analysis being the alignment mapping. Six qualitative analyses of lexicographic comparisons were preformed:

- 1. The DoD's basic (DAWIA Level I) PM competencies to the PMI's *PMBOK Guide* knowledge areas and processes
- 2. The DoD's intermediate (DAWIA Level II) PM competencies to the PMI's *PMBOK Guide* knowledge areas and processes
- 3. The DoD's intermediate (DAWIA Level II) PM competencies to the PMI's *TSPgM* program management domains
- 4. The DoD's advanced (DAWIA Level III) PM competencies to the PMI's *PMBOK Guide* knowledge areas and processes
- 5. The DoD's advanced (DAWIA Level III) PM competencies to the PMI's *TSPgM* program management domains
- 6. The DoD's advanced (DAWIA Level III) PM competencies to the PMI's *TSPfM* portfolio management domains

The analysis resulted in the mapping of 1,085 DoD PM competency elements to PMI knowledge areas and domains. The next step in this research applied a quantitative analysis to the completed competency map (Bernard, 1996). This transition to a matrix format was completed in conjunction with the more qualitative analysis by classifying each element mapping as either aligned (Green/"G"), somewhat aligned (Yellow/"Y"), completely unaligned (Red/"RR"), or not applicable (Black/"N/A").

DATA ANALYSIS

This section addresses the extent to which the DoD's 2016 PM functional career field competencies are aligned with the PMI's *PMBOK Guide*, *TSPgM*, and *TSPfM*. The first step taken in the analysis was to count how many DoD competency elements were mapped to the PMI's *PMBOK Guide*, *TSPgM*, and *TSPfM* and were classified as *aligned*, *somewhat aligned*, *completely unaligned*, or *N/A* (refer to Table 1). Categories were created for the *PMBOK Guide*, *TSPgM*, and *TSPfM* by combining the basic, intermediate, and advanced elements that mapped to each standard. A fourth category was included that combined the findings across all three PMI standards to demonstrate the extent of alignment between the DoD PM competencies and the PMI standards for



when all PMI standards were applied. For example, if a single element was labeled as aligned under the *PMBOK Guide* but completely unaligned under *TSPgM* and *TSPfM*, it would be classified as aligned under the All PMI category. This method demonstrates the value of applying all three PMI standards in DoD PM training instead of only the *PMBOK Guide*. Finally, a fifth category was applied that shows the number of elements categorized as 100% aligned, somewhat aligned, or completely unaligned with the *PMBOK Guide*, *TSPgM*, and *TSPfM*. This category is significant because it shows that when all three PMI standards are applied, only eight of 190 DoD PM competency elements are completely unaligned with the *PMBOK Guide*, *TSPgM*, and *TSPfM* as depicted in Figure 5.

	Basic PMBOK Guide	Intermediate PMBOK Guide	Intermediate TSPgM	Advanced PMBOK Guide	Advanced TSPgM	Advanced <i>TSPfM</i>
Aligned	73	65	52	56	47	47
Somewhat Aligned	66	83	98	99	115	116
Completely Unaligned	20	29	27	35	28	27
N/A	31	13	13	0	0	0
	190	190	190	190	190	190

Table 1. Quantity of DoD PM Competency Elements Mapped to the PMI's Standards (Organized by Level of Alignment and DAWIA Level)



Figure 5. Extent to Which the DoD PM Competency Elements Align to the PMI Standards by Pie Chart

Based on these findings, it is evident that the *PMBOK Guide* is the PMI standard that is most aligned with the DoD PM competency elements. This is expected, as the *PMBOK Guide* serves as the building block for *TSPgM* and *TSPfM* and is the broadest of the three standards. However, by adding *TSPgM* and *TSPfM* standards to the standards of the *PMBOK Guide*, the alignment level of the PMI standards with the DoD PM competencies increases to 96% (61% completely aligned and 35% somewhat aligned). Furthermore, the percentage of elements that are categorized as completely unaligned or not applicable decreased to 4% and 0%, respectively.

Figures 6–9 further elaborate on the impact achieved when applying all three PMI standards to DoD PM competencies in order to provide sufficient detail in



determining which DoD PM competency elements need to be improved upon to ensure sufficient alignment with the PMI standards. These figures provide a visualization of the progressive improvement in alignment as all three PMI standards are applied. Figure 6, Figure 7, Figure 8, and Figure 9 demonstrate the different levels of alignment within the Acquisition Management, Business Management, Technical Management, and Executive Leadership DoD PM categories, respectively.

	Element	PMBOK Guide		TSPgM TSPfM		All PMI Standards			
Unit of Competency		Basic	Int	Adv	Int Adv	Adv	Basic	Int	Adv
	111								
	1.1.2								
	1.1.3								
	1.1.4							_	
Canability Integration	1.1.5								
Capaolity integration	1.1.6								
Planning	121		_						
	122								
	12.3								
	1.2.4								
	1.3.1								
	2.1.1								
	2.2.1								
Acquisition Law and Policy	2.3.1								
	2.4.1								
	2.5.1								
	2.0.1								
	3.12								
	3.1.3								
	3.1.4								
	3.1.5								
	3.2.1		_						
	3.2.2								
	3.2.3								
	3.3.1								
	333								
	3.3.4								
Program Execution	3.4.1								
_	3.4.2								
	3.4.3								
	3.4.4								
	3.4.5		_						
	3.4.6								
	3.5.1								
	3.5.3								
	3.5.4								
	3.6.1								
	3.6.2								
	3.6.3								
Stalashaldan Managarat	4.1.1								
Stakenoider Management	4.2.1								
	511								
	5.12								
	5.2.1								
International Acquisition and	5.2.2								
Exportability (IA&F)	5.3.1								
Exportability (IACE)	5.3.2								
	5.3.3								
	5.4.1								
	5.4.2								
Services Acquisition	611								
	611								

Figure 6. Alignment of Acquisition Management DoD PM Category by PMI Standard



	Element	PMBOK Guide			TSPgM		TSPfM	All PMI Stand		ndards
Unit of Competency		Basie	Int	Adv	Int	Adv	Adv	Basie	Int	Adv
	1.1.1									
	1.1.2									
	1.1.3									
	1.1.4									
	1.2.1									
	1.2.2									
	1.2.3									
	1.2.4									
	1.2.5									
	1.2.6									
	1.2.7									
	1.2.8									
Contract Management	1.2.9									
	1.2.10									
	1.2.11									
	1.3.1									
	1.3.2									
	1.4.1									
	1.4.2									
	1.4.3									
	1.4.4									
	1.4.5						-			
	1.4.6						-			
	1.4.7						-			
	1.5.1									
	2.1.1									
	2.2.1									
	2.3.1									
	2.3.2									
Electronical Management	2.3.3									
rmancial Management	2.4.1									
	2.4.2					_				
	2.4.3									
	2.4.4									
	2.5.1									
	1 252									

Figure 7. Alignment of Business Management DoD PM Category by PMI Standard



Figure 8. Alignment of Technical Management DoD PM Category by PMI Standard



	Element	PMBOK Guide		TSF	PgM	TSPfM	All PMI Standards		ndards	
Unit of Competency		Basie	Int	Adv	Int	Adv	Adv	Basie	Int	Adv
	1.1.1									
	1.1.2									
	1.2.1									
	1.3.1									
	1.3.2									
Foundational Competencies	1.3.3									
roundational competencies	1.4.1									
	1.4.2									
	1.4.3									
	1.5.1					_				
	1.6.1									
	1.6.2									_
	2.1.1									
	2.1.2									
	2.2.1		_		-					
Leading Change	2.3.1									
	2.3.2									
	2.4.1									
	2.4.2									
	3.1.1				-					
Londing Boonlo	3.2.1				-					
Leading People	3.2.2									
	3.5.1									
	5.4.1									
	4.1.1									
	4.1.2									
	4.2.1									
	4.2.3									
	431									
Results Driven	432									
	4.3.3									
	4.3.4									
	4.4.1									
	4.5.1									
	4.5.2									
	4.5.3									
	5.1.1									
	5.1.2									
Building Coalitions	5.1.3									
	5.2.1									
	5.2.2									

Figure 9. Alignment of Executive Leadership DoD PM Management Category by PMI Standard

The visualizations in these figures demonstrate the alignment improvement of incorporating all three PMI standards to the DoD PM categories. The visualizations also provide a clear view of which DoD PM category is least aligned with the PMI standards. The Acquisition Management DoD PM category from Figure 6 contains the two DoD PM units of competency that are the least aligned across all three PMI standards. They include Acquisition Law and Policy (0% aligned, 33% somewhat aligned, and 67% completely unaligned) and the International Acquisition and Exportability (0% aligned, 74% somewhat aligned, and 26% completely unaligned) units of competency. This is not surprising since these two units of competency are mostly exclusive to the DoD's nature of work and would not contain lexicon that would be commonplace in an industry-wide standard. Therefore, courses in these two units of competency would need to augment acquisition/PM training if the DoD adopted PMI certification standards.

The next section provides a breakdown of the competency mapping by the *PMBOK Guide* project management knowledge areas, *TSPgM* program management performance domains, and *TSPfM* portfolio management performance domains to answer the question, *What PMI knowledge areas and performance domains are most aligned and least aligned with the DoD program management functional career field competency elements?* Analyzing the level of alignment between the DoD's PM functional career field competencies and the PMI standards at this level enables DoD officials to see which knowledge areas and domains are not being applied in the DoD's PM competencies.

This analysis required the approach of mapping the DoD's PM competency elements to the PMI knowledge areas and performance domains by determining the DoD PM competency elements that aligned (both completely and somewhat) with the



PMI's knowledge areas and performance domains. This process enabled the tallying of each knowledge area and performance domain that aligned with the DoD PM competency elements. Figure 10 demonstrates the extent to which each of the *PMBOK Guide*'s 10 knowledge areas align with the DoD PM competency elements. This analysis enables DoD stakeholders like the DAU to adjust training objectives to appropriately integrate the *PMBOK Guide* project management knowledge areas into PM certification curriculum.



Figure 10. Alignment of the *PMBOK Guide* Project Management Knowledge Areas to DoD Competency Elements

The knowledge areas that exhibited the greatest level of alignment include 4 – Project Integration Management, and 12 – Project Procurement Management.

- **4 Project Integration Management:** This knowledge area made up 19% of all the aligned and somewhat aligned DoD PM competency elements—more than any other section. Project Integration Management includes the coordination of processes across every *PMBOK Guide* process group (initiating, planning, executing, monitoring and controlling, and closing).
- **12 Project Procurement Management:** This knowledge area made up 13% of all the aligned and somewhat aligned elements.

The knowledge areas that exhibited the lowest level of alignment include 6 – Project Schedule Management, 10 – Project Communications Management, and 7 – Project Cost Management.

- **6 Project Schedule Management:** This knowledge area made up only 3% of the aligned and somewhat aligned DoD PM competency elements. This deficiency in alignment is concerning because managing schedule is one of the three project management tenets that make up the triple constraint of project management (Atkinson, 1999).
- 7 Project Cost Management: This knowledge area made up 6% of the aligned and somewhat aligned DoD PM competency elements. As stated, cost management is one of the three components of the triple constraint and is therefore critical in project management.
- **10 Project Communications Management:** This knowledge area made up only 5% of the aligned and somewhat aligned DoD PM competency elements. The impact that communications management can have on a project cannot be



overstated. Mortlock (2016) opined that including some form of communications document (e.g., a strategic communication [STRATCOM] plan) that conveys a project's or program's desired impact and synchronizes its implementation and execution plans has proven valuable to program success.

To summarize, the least aligned *PMBOK Guide* knowledge areas include project cost, schedule, and communications management. Two of these three are related to the triple constraint, which—if not well-managed—can significantly impact project outcomes. The fact that the DoD PM competencies do not align well with these *PMBOK Guide* sections may be cause for concern because it is an indicator that the DoD is not adequately training their PMs on the importance of managing schedule, cost, and communications—at least in the realm of formal acquisition training.

This section demonstrates the extent to which each of *TSPgM*'s program management performance domains—and elements across all domains—align with the intermediate and advanced DoD PM competency elements (see Figure 11). This analysis enables DoD stakeholders to focus on the most relevant *TSPgM* program management performance domains when restructuring their certification curriculum.





The program management performance domains that exhibited the greatest level of alignment include All – Elements Across All Knowledge Areas and 3 – Program Strategy Alignment. The remaining four performance domains exhibited mostly similar levels of alignment (9%–11%).

This section demonstrates the extent to which each of *TSPfM*'s portfolio management performance domains—and elements across all domains—align with the advanced DoD PM competency elements (see Figure 12). This analysis enables DoD stakeholders to focus on the most relevant *TSPfM* program management performance domains when restructuring their certification curriculum.







The portfolio management performance domains that exhibited the greatest level of alignment include 2 – The Portfolio Life Cycle, 3 – Portfolio Strategic Management, and 4 – Portfolio Governance.

- 2 The Portfolio Life Cycle: Just as the PMBOK Guide Project Integration Management knowledge area was highly aligned with the DoD PM competencies, so too is this performance domain (13%). Project Integration Management and Portfolio Life Cycle Management heavily rely on information systems that enable effective communication and support seamless and timely transitions between project and life-cycle phases (PMI, 2017a, 2017b).
- **3 Portfolio Strategic Management:** This performance domain makes up 15% of the aligned DoD PM competencies. Decisions relying on strategic alignment are made at the executive level.
- **4 Portfolio Governance:** This performance domain makes up 14% of the aligned DoD PM competency elements. The effective implementation of Portfolio Governance aids an organization in becoming auditable (Rendon & Rendon, 2015).

The performance domain that exhibited the lowest level of alignment was 8 – Portfolio Risk Management.

• **8 – Portfolio Risk Management:** This domain made up the lowest number of aligned DoD PM elements. This indicates that the current DoD PM competency elements do not include many elements related to risk management at the advanced level. The DoD should consider addressing this training gap to improve their PMs' ability to identify, analyze, and manage risks at the portfolio level.

CONCLUSIONS

This research provided the DoD with information and insight necessary to effectively respond to the Fiscal Year 2020 NDAA's (2019) mandate to base acquisition workforce certification requirements on nationally or internationally recognized third-party standards. The goal of the NDAA's mandate is to improve the quality of the DoD's program management workforce through effective training. As globally recognized standards, PMI's *PMBOK Guide*, *TSPgM*, and *TSPfM* serve as excellent foundations on



which to base the DoD's program management certification requirements. The researchers investigated the degree to which the DoD's PM competencies align with the standards of the PMI's *PMBOK Guide, TSPgM,* and *TSPfM.* Analyzing and defining the level of alignment between the two standards enables training organizations to provide more comprehensive training to the acquisition workforce that leverages internationally recognized PM standards.

From a high-level perspective, the *PMBOK Guide* proved to be the most aligned, *TSPgM* is the second most aligned, and *TSPfM* is the least aligned with DoD PM competencies. The knowledge areas and performance domains that were most aligned with the DoD's PM competency elements included concepts for strategic management and life-cycle management. The most concerning finding from this research was the discovery of the relatively low level of alignment of the schedule and cost management knowledge areas across DoD PM competencies.

 To what extent are the DoD's 2016 program management competency elements aligned with the PMI's PMBOK Guide, TSPerM and TSPIM, Which PMI standard is the most aligned? 								
PMBOK Guide	TSPgM	TSPfM	All PMI Standards					
34% Aligned (Most Aligned)	26% Aligned	25% Aligned	61% Aligned					
What PMI knowledge areas	and performance doma	ins are most and least aligned w	rith the DoD program					
management functional career	field competency elem	ents?						
	PMBOK Guide K	nowledge Areas						
Most Aligned Least Aligned								
All – Elements Across All Kno	owledge Areas	6 – Project Schedule Management						
4 – Project Integration Manage	ement	7 – Project Cost Managemen	t					
13 – Project Stakeholder Mana	gement	10 – Project Communication	s Management					
	TSPgM Perform	ance Domains						
Most Align	ed	Least Alig	ned					
All – Elements Across All Per	formance Domains	N/A						
3 – Program Strategy Alignme	nt							
TSPfM Performance Domains								
Most Aligned Least Aligned								
2 – The Portfolio Life Cycle 8 – Portfolio Risk Management								
3 – Portfolio Strategic Management 4 – Portfolio Governance								
4 – Portfolio Governance								

Table 2. Summary of Research Findings

The following are recommendations based on this research.

1. Base the new DAWIA PM training certification requirements on the *PMBOK Guide*, *TSPgM*, and *TSPfM*.

A review of the literature and the analysis of the mappings between the DoD's PM functional career field competencies and the PMI standards have led the researchers to believe that the DoD should base their new certification requirements on all three PMI standards. The progressive complexity and scope of the DAWIA certifications "correlate to the complexity and responsibilities required for designated positions and different types of assignments in weapon systems, services, business management systems and information technology, and international acquisitions" (Redshaw, 2011, p. 55). Because the *PMBOK Guide* is exclusively aimed towards individuals charged with managing temporary endeavors (projects), it would not suffice as the sole source of training for the DoD's program management workforce. For example, many PMs lead complex, decades-long programs and manage portfolios that contain a multitude of different projects and programs. Such endeavors require a higher-level managerial perspective and scope of control than the *PMBOK Guide* provides. Therefore, the *PMBOK Guide* would not be able to meet the progressive complexities of



the DAWIA certifications and operational responsibilities that are reflected in the DoD's acquisition workforce. By adding *TSPgM* and *TSPfM* to the certification framework of their PMs, the DoD can account for the increase in managerial scope that PMs will see as they progress in their careers.

2. Maintain the three-tiered certification model.

The DAWIA three-tiered certification model consists of Level I (basic), Level II (intermediate), and Level III (advanced). This progressive education model enables PMs to be trained on relevant subject matter that align with required responsibilities and prevents them from learning out-of-scope material too early in their career. For example, a DoD project manager would rarely require training on portfolio life-cycle management when the scope of their responsibilities is to manage small projects. On the other hand, DoD program executive officers, who primarily manage portfolios, require training on basic project management practices because project and program management fundamentals form the basis of portfolio governance and strategic alignment across projects, programs, and portfolios. To guide PMs from project management to being capable of leading vast programs and portfolios, the DoD must establish training that gradually increases in scope in correlation with the scope of the PM's current job responsibilities. This can be accomplished by establishing certification standards based on the following model:

- DAWIA Level I (basic/project managers) PMP certification based on the PMBOK Guide
- DAWIA Level II (intermediate/PMs) PgMP certification based on TSPgM
- DAWIA Level III (advanced/program and portfolio managers) PfMP certification based on *TSPfM*

This would allow for a gradual increase in program management knowledge and application and align experience to training certifications. To improve upon this model, the DoD should enable cross-sectioning of the three PMI standards into each certification level. As mentioned, the *PMBOK Guide* serves as the foundation for both *TSPgM* and *TSPfM* and therefore holds valuable information that should be used in the training of managers of programs and portfolios. Likewise, including sections of *TSPgM* and *TSPfM* with the Level I education allows inexperienced DoD PMs to understand the larger picture of their projects and how they fit into programs and portfolios.

3. Augment professional certifications with DoD-specific PM training.

As this research has demonstrated, the three PMI standards alone do not cover all the DoD PM competencies. For example, if the PMP certification is adopted for DAWIA PM Level I (basic), *TSPgM* certification is adopted for DAWIA PM Level II (intermediate), and *TSPfM* certification is adopted for DAWAI PM Level III (advanced), additional DAU training courses would need to focus on the areas least aligned, like Acquisition Law and Policy and International Acquisition and Exportability. Additional DAU training would be required in the areas not covered by PMI standards sufficiently, including the following:

- Acquisition Management
 - Acquisition Policy and Law
 - International Acquisition and Exportability
- Business Management
 - Contract Management, specifically in pre-solicitation planning and execution



- Technical Management
 - Engineering Management, specifically technical planning in understanding, applying, and ensuring program protection, cybersecurity, and counterintelligence

Considering that 190 DoD PM competencies exist, the fact that PMI standards aligned reasonably well reinforces the recommendation to adopt the PMI standards.

4. Consider all three components of auditability.

In conjunction with the modification to its PM certification requirements, the DoD should consider the research of Eckerd and Snider (2017) and Rendon and Rendon (2015). Both sets of research emphasize the importance of ensuring capable processes and effective internal controls. While this research exclusively considered the development of competent personnel through an analysis of training standards, the DoD should ensure that correct measures are being taken in modifying training certifications and in developing effective processes to transition the workforce and the training staff to the new standards.

5. Revitalize the U.S. Department of Defense Extension to: A Guide to the Project Management Body of Knowledge.

To fill competency gaps that are not covered by PMI standards, the DoD should look to the U.S. Department of Defense Extension to: A Guide to the Project Management Body of Knowledge (PMBOK Guide; DoD & DAU, 2003).

References

- Alie, S. S. (2016). Interlocking program and project governance with PMI's process groups: How to form the proper baseline and tailor project/program governance [Paper presentation]. PMI Global Congress 2016, EMEA, Barcelona, Spain. <u>https://www.PMI.org/learning/library/interlocking-program-project-governance-PMIprocess-group-10175</u>
- Atkinson, R. (1999). Project management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, *17*(6), 337–342. <u>https://doi.org/10.1016/S0263-7863(98)00069-6</u>
- Bernard, R. H. (1996). Qualitative data, quantitative analysis. *Journal of Computational and Applied Mathematics*, *8*(1), 9–11. <u>https://doi.org/10.1177/1525822X960080010401</u>
- Bond, D. P., Davis, S. M., & Pearsall, A. D. (2016). *The Goldwater–Nichols Act of 1986: 30 years of acquisition reform* [Master's thesis, Naval Postgraduate School]. NPS Archive: Calhoun. <u>https://calhoun.nps.edu/handle/10945/51649</u>
- Choi, D. (2009). A study on improving defense acquisition through the application of Defense Acquisition Workforce Improvement Act (DAWIA) concept to defense industry workforce [Master's thesis, Naval Postgraduate School]. NPS Archive: Calhoun. <u>http://hdl.handle.net/10945/4571</u>
- Defense Acquisition Workforce Improvement Act, H.R. 5211, 101st Cong. (1990). https://www.congress.gov/bill/101st-congress/house-bill/5211
- DoD & Defense Acquisition University. (n.d.). Certification standards & core plus development guide: Program management level 1. DAU. https://icatalog.dau.edu/onlinecatalog/CareerLvl.aspx?lvl=1&cfld=9



- DoD & Defense Acquisition University. (2003). U.S. Department of Defense Extension to: A guide to the project management body of knowledge (PMBOK guide). Defense Acquisition University Press. <u>http://www.risk-services.com/DoDExtPMBOKJune2003.pdf</u>
- Eckerd, A., & Snider, K. (2017). Does the program manager matter? New public management and defense acquisition. *The American Review of Public Administration*, 47(1), 36–57. <u>http://hdl.handle.net/10945/62045</u>
- Gansler, J. S., Berteau, D. J., Maddox, D. M., Oliver, D. R., Salomon, L. E., & Singley, G. T. (2007). Urgent reform required: Army expeditionary contracting. Report of the Commission on Army Acquisition and Program Management in Expeditionary Operations. <u>https://ogc.altess.army.mil/Documentation/EandF/Guidance/Gansler%20Commission</u> <u>%20Report_Final%20Report_10-31-07.pdf</u>
- GAO. (1995). High-risk series: An overview (GAO/HR-95-1).
- GAO. (2010). Defense acquisition workforce: DoD's training program demonstrates many attributes of effectiveness, but improvement is needed (GAO-11-22).
- GAO. (2018a). Defense acquisition workforce: Opportunities exist to improve practices for developing program managers (GAO-18-217).
- GAO. (2018b). F-35 Joint Strike Fighter: Development is nearly complete, but deficiencies found in testing need to be resolved (GAO-18-321).
- GAO. (2019a). High-risk series: Substantial efforts needed to achieve greater progress on high-risk areas (GAO-19-157SP).
- GAO. (2019b). Improving program management: Key actions taken, but further efforts needed to strengthen standards, expand reviews, and address high-risk areas (GAO-20-44).
- Holtzman, J. (1999). Getting up to standard. *PM Network*, *13*(12), 44–46. <u>https://www.PMI.org/learning/library/ansi-standard-5057</u>
- Kupec, C. (2013). *Project management professional training needs for defense industry projects* [Doctoral dissertation, Old Dominion University]. ODU Digital Commons. <u>https://digitalcommons.odu.edu/stemps_etds/64</u>
- MacStravic, J. A. (2016, September 6). *Program management functional career field competencies* [Memorandum]. DoD. <u>https://www.dau.edu/training/career-</u> <u>development/program-</u> <u>management/Lists/Blog/Attachments/29/Prog%20Mgmt%20Funct%20Competencies</u> <u>160906%20(003).pdf</u>
- Mortlock, R. F. (2016, April–June). Stratcom strong. *Army AL&T Magazine*, 126–129. <u>https://asc.army.mil/docs/magazine2/armyalt-apr-jun2016.pdf</u>
- Mortlock, R. F. (2020, Spring). Been there, done that: The profession of acquisition. *Army AL&T*, 72–77. <u>https://asc.army.mil/armyalt/Spring2020/html/7.html</u>
- National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116–92 § 861 (2019). https://www.congress.gov/bill/116th-congress/senate-bill/1790/text

Office of the Under Secretary of Defense for Acquisition and Sustainment. (2020a). *Operation of the adaptive acquisition framework* (DoDI 5000.02). DoD. <u>http://acqnotes.com/wp-content/uploads/2014/09/DoD-Instruction-5000.2-Operation-</u> of-the-Adaptive-Acquisition-Framework-23-Jan-2020.pdf



- Office of the Under Secretary of Defense for Acquisition and Sustainment. (2020b). *The defense acquisition system* (DoDD 5000.01). DoD. <u>https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/500001p.pdf?ver</u> =2020-09-09-160307-310
- Pernin, C., Axelband, E., Drezner, J., Dille, B., Gordon IV, J., Held, B., McMahon, S., Perry, W. Rizzi, C., Shah, A., Sollinger, J., & Wilson, P. (2012). *Lessons from the Army's Future Combat Systems program* (Report No. HQD105725). RAND. <u>https://www.rand.org/content/dam/rand/pubs/monographs/2012/RAND_MG1206.pdf</u>
- President's Blue Ribbon Commission on Defense Management. (1986). A quest for excellence: Final report to the president. Government Printing Office.
- Project Management Institute. (2017a). A guide to the Project Management Body of Knowledge (6th ed.).
- Project Management Institute. (2017b). The standard for portfolio management (4th ed.).
- Project Management Institute. (2017c). The standard for program management (4th ed.).
- Project Management Institute. (2020). *Project Management Institute certifications*. <u>https://www.PMI.org/certifications/types</u>
- Redshaw, M. (2011). Developing competencies required for directing major defense acquisition programs: Implications for leadership [Doctoral dissertation, University of Phoenix]. ProQuest Dissertations Publishing. <u>http://search.proquest.com/openview/3c8ebde08bf348e5c110f4ce06cc3319/1?pq-origsite=gscholar&cbl=18750&diss=y</u>
- Rendon, R. (2010). Professionalization of the U.S. defense acquisition workforce: Progress, problems and future directions [Faculty publication, Naval Postgraduate School]. NPS Archive: Calhoun. <u>http://hdl.handle.net/10945/40376</u>
- Rendon, R. (2019). Enhancing professional and technical excellence: Analysis of contract management competency models. *Proceedings of the 16th Annual Acquisition Research Symposium*, *1*, 86–112. <u>http://hdl.handle.net/10945/63019</u>
- Rendon, R., & Rendon, J. (2015). Auditability in public procurement: An analysis of internal controls and fraud vulnerability. *International Journal of Procurement Management*, 8(6), 710–730.
- Ross, D. W., & Shaltry, P. E. (2006). *The new PMI standard for program management* [Paper presentation]. PMI Global Congress 2006, EMEA, Seattle, WA.
- Schwartz, M. (2010). *The Nunn–McCurdy Act: Background, analysis, and issues for Congress* (CRS Report No. R41293). Congressional Research Service. https://apps.dtic.mil/sti/citations/ADA524187
- Shenhar, A., & Dvir, D. (2004, July 14). *Project management evolution: Past history and future research directions* [Paper presentation]. PMI Research Conference, London, England. <u>https://www.PMI.org/learning/library/project-management-evolution-research-directions-8348</u>
- Woolsey, J. (2019). 2019 annual report: Transforming acquisition training. DAU. <u>https://www.dau.edu/about/_layouts/15/WopiFrame.aspx?sourcedoc=/about/Docume_nts/2019%20Annual%20Report.pdf&action=default</u>





Acquisition Research Program Graduate School of Defense Management Naval Postgraduate School 555 Dyer Road, Ingersoll Hall Monterey, CA 93943

WWW.ACQUISITIONRESEARCH.NET