

THE CROW'S NEST

ISSUE 3

JANUARY 2022



A QUARTERLY REVIEW OF RESEARCH & ACTIVITIES
FROM THE ACQUISITION RESEARCH PROGRAM
AT NAVAL POSTGRADUATE SCHOOL



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PROGRAM UPDATES

“The only easy day was yesterday!”

That Navy SEAL aphorism well describes our Acquisition Research Program experience over the past three months. Our program and faculty have been busy conducting and publishing sponsored research and taking a leading role in transformations at Naval Postgraduate School (NPS), in addition to supporting our world-class student program and hosting events for the acquisition research community.



Dave Lewis

FACULTY RESEARCH

NPS faculty were awarded two of eight projects from the OSD Acquisition Innovation Research Center (AIRC) last summer. The AIRC projects are wrapping up later this quarter.

The Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN RDA) funded six additional ARP research proposals, all in the fourth quarter. All six of the fourth quarter ASN RDA research proposals are complete. One has already been published, and the rest are in final review.

PEO Ships also funded several interdisciplinary research projects in FY21. That work is proceeding apace.

TRANSFORMATION AT NPS

The Graduate School of Defense Management was renamed the Department of Defense Management (DDM) and was selected to lead the “NPS Next” transformation effort.

DDM is in the midst of reconfiguring its acquisition education curricula into focused, tailorable and flexible 12-month Master of Science degrees with ability to expand to 15-month or 18-month options to accommodate additional academic certificates or joint professional military education (JPME). DDM remains dedicated to meeting student and sponsor requirements for our prior curricular offerings through 2023 for inbound student cohorts. Shorter degrees enable faster cycle times and higher student throughput while also allowing curricula sponsors additional flexibility to concentrate student and faculty studies and acquisition research into emerging critical new naval technologies and warfare mission areas.

The Naval Warfare Studies Institute (NWSI) has now fully integrated ARP into NWSI as the Acquisition Warfare Chair, with yours truly performing temporary duties as NWSI’s Interim Director.

Our close, interdisciplinary association with NWSI opens new ARP research opportunities in technology implementation, operational fielding, financial management, using and assessing the Adaptive Acquisition Framework (AAF), implementing Budget Activity eight (BA-8) “software money,” technology Task Force effectiveness and productivity, rapid prototype concepts and methods, requirements generation in an agile/flexible/adaptable world and PPBE reform among many others. Our faculty is excited to work in these emerging areas of acquisition innovation.

ARP also has started sponsoring acquisition-themed NWSI Warfare Integration Workshops. These are short one-to-three-day student/faculty/industry/sponsor events designed to explore a new concept or idea in depth. Our first is scheduled for 02 Feb to conduct a case study on rapid acquisition. Details below!

ANNUAL SYMPOSIUM

We will be hosting our 19th NPS Acquisition Symposium virtually on 11-12 May with over 70 papers, two keynote speakers, two plenary panel sessions and more than two dozen topical panels and discussion sessions. This Symposium is still the Defense Department’s only dedicated acquisition research event. Invitations for Keynote speakers and Panels Chairs are being extended now! Please mark your calendars; I look forward to seeing you in May for another exciting & informative Symposium. Details below!



ARP, DDM, and NWSI have stepped up and taken leadership roles in the NPS Next transformation process, initiating, and implementing innovative, academically rigorous, topically aligned, operationally relevant educational and research programs that best meet the Navy’s evolving naval warfare missions, technologies, and requirements. It is a very exciting and fulfilling time!

Sincerely,

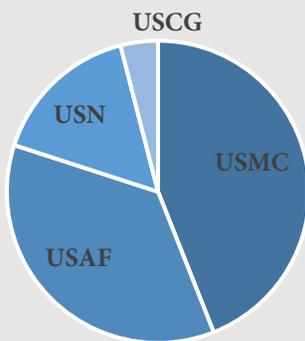
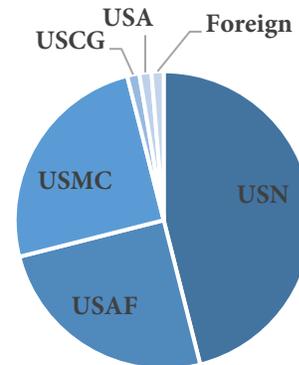
A handwritten signature in black ink, appearing to be 'David H. Lewis', written in a cursive style.

VADM David H. Lewis, USN (Ret.)
Chair of Acquisition

STUDENT SPOTLIGHT

DECEMBER 2021 GRADUATES, THESES, & AWARDS

In December, 78 students graduated from the Department of Defense Management and were supported by ARP. Thirty-five of these students came from the U.S. Navy, 21 from U.S. Marine Corps, 19 from U.S. Air Force, and one each from U.S. Army, U.S. Coast Guard, and foreign Army.



Twenty-five of these students produced ARP thesis projects. Eleven of these come from the U.S. Marine Corps, 9 from the Air Force, 4 from the Navy, and 1 from the Coast Guard. Working individually or on teams, these students produced **12 thesis reports** and garnered **five awards**.

AWARDS

Five students were recognized for excellence with awards from the Naval Postgraduate School, Naval Supply Systems Command, and the Secretary of the Air Force:

CAPT Mitch Mickley, USAF

The Louis D. Liskin Award for Academic Excellence

Thesis: [Navigating Department of Defense Additive Manufacturing Acquisition Practices](#)

- With co-authors Capt. Brett Hagen and Capt. Piara Swank (USAF)
- *Advisors: Dr. Daniel J. Finkenstadt and Dr. Robert F. Mortlock*

CAPT Matt Marshall, USAF

Distinguished Professor Kenneth J. Euske Dean's Medal for Innovative Contribution to National Defense

Thesis: [Sandbox Contracting: An Evaluation of Gamified Vs. Traditional Contracting Training Methods at the USAF Enlisted Contracting Technical School](#)

- With co-authors CAPT Lee Whitworth and CAPT Ian Larsson, USAF
- *Advisors: Lt Col Daniel J. Finkenstadt and Dr. Erik Helzer*

CAPT Lee Whitworth, USAF

Secretary of the Air Force Academic Achievement Award

Thesis: [Sandbox Contracting: An Evaluation of Gamified Vs. Traditional Contracting Training Methods at the USAF Enlisted Contracting Technical School](#)

- With co-authors CAPT Lee Whitworth and CAPT Ian Larsson, USAF
- *Advisors: Lt Col Daniel J. Finkenstadt and Dr. Erik Helzer*

Maj. Jordan Reid, USMC

The Louis D. Liskin Award for Academic Excellence

Thesis: [Gap Analysis of Department of Defense Program Management Competency Standards in Preparation for the Shift to Portfolio Management in Defense Acquisitions](#)

- With co-authors Maj. Adam Deitrich and Maj. Conor Stewart (USMC)
- *Advisors: Raymond D. Jones and Dr. Robert F. Mortlock*

LT Samuel Adjei, USN

Naval Supply Systems Command Award for Academic Excellence Management

Thesis: [Increasing Defense Contractor Competition in a Predominantly Sole-Source Contracting Environment](#)

- With co-author LCDR Creete Hendricks II (USN)
- *Advisors: Dr. Geraldo Ferrer and Dr. Rene G. Rendon*

OTHER THESES

December graduates completed an additional nine research theses, seven of which are listed below by topic area.¹

ACQUISITION MANAGEMENT

[Qualitative Investigation of 4PL Value Offerings to the USCG and USMC](#)

LCDR Kenneth Au (USGC), ENS Annalee Blake (USN)

Advisors: Dr. Robert F. Mortlock and Raymond D. Jones

¹ Two theses were in final processing when this publication went to press.

[Non-FAR Acquisition Organization Elements](#)

Capt. Peter Barringer, Capt. Craig Miles (USAF)

Advisors: Dr. Robert F. Mortlock and Dr. Rene G. Rendon

[The Price of Slavery: An Analysis of Human Trafficking Policy and Spending in Department of Defense Procurement](#)

Capt. Willis Crouch IV, 1st Lt. Austin Morris, 1st Lt. Kevin Peaslee (USAF)

Advisors: Dr. Daniel J. Finkenstadt and Dr. Erik Helzer

CONTRACT MANAGEMENT

[Analysis of the Marine Corps Expeditionary Contracting Workforce Competency Assessment](#)

Capt. Bradley Hoover (USMC)

Advisors: Dr. Rene G. Rendon and Kelley Poree

HUMAN RESOURCES

[Marine Corps Mentorship Program: The Effects of Mentorship on Career Progression and Talent Management](#)

Capt. Brandon Mitchell and Capt. Joseph Reese (USMC)

Advisors: Dr. Paul Lester and Dr. Kathryn J. Aten

LOGISTICS MANAGEMENT

[Incorporating Predictive Maintenance Best Practices Into Marine Corps Training and Operations](#)

Capt. Mitchell B. Stuetelberg and Maj. Jonathan Thomas (USAF)

Advisors: Dr. Eva Regnier and Bryan Hudgens

[The Effect of Unreported Demand on the F/A-18's Supply Chain](#)

Capt. Kory Delehanty, Capt. Edward Morales, Maj. Keith Rudolf (USMC)

Advisors: Dr. Geraldo Ferrer and Dr. Margaret M. Hauser



EVENTS

ARP is embracing the opportunity to create more connections with our acquisition research community through virtual events—our annual symposium and smaller webinars throughout the year. Our big upcoming event is the 19th Annual Acquisition Research Symposium, offered for the second time as a virtual symposium. Last year’s inaugural virtual event was a huge success. Over 1000 people registered, and we saw meaningful conversations in panel sessions, after keynote speakers, and during our social coffee breaks and happy hours. We typically have three or four smaller webinars during the year to keep the conversation going.

19TH ANNUAL ACQUISITION RESEARCH SYMPOSIUM

The Naval Postgraduate School announces the 19th Annual Acquisition Research Symposium to be held May 11-12, 2022, as a virtual interactive event.

This symposium serves as a forum for the presentation of acquisition research and the exchange of ideas among scholars and practitioners of public-sector acquisition. Registration is open for attendees.

PANELS

- New Priorities, Familiar Challenges: Defense Trends in Budgets, Appropriations, and Contract Obligations
- Innovating in Acquisition: Organizations, Technologies, and Applications
- Understanding Today’s Defense Industrial Base
- Building and Securing the Fleet
- Supporting the Current & Future Workforce
- Supply Chain Concerns
- Moving Forward with Unmanned Systems
- Contracting Strategies for Diverse Needs
- Resourcing the Future Fight: Current PPBE Challenges & Opportunities for Reform
- Adaptive Acquisition Framework: How It’s Going
- Can Space Acquisition Chart New, Agile Processes?
- Acquisition Workforce: Insights from the Service Directors, Acquisition Career Management (DACMs)
- Implications of the National Defense Strategy for Defense Acquisition System
- Understanding Requirements: People, Processes, and Technology
- Designing and Deploying Artificial Intelligence to Improve Performance
- Contracting Strategies that Improve Outcomes
- Agile Practices in Software-intensive programs
- Machine Learning: Challenges and Opportunities for the Acquisition Workforce
- Rethinking Earned Value Management in Incremental Acquisitions

- Ensuring cybersecurity across the acquisition ecosystem
- Modernizing and Assessing Acquisition Business Processes
- Digital Engineering across the Acquisition Lifecycle
- Getting and Using the Right Acquisition Data
- Student Poster Presentations

Don't miss this opportunity to hear the latest in acquisition research and policy priorities, and to connect with other acquisition experts.

Register at the symposium website: www.researchsymposium.com



UPCOMING EVENT: RAPID ACQUISITION WORKSHOP

On February 2, 2022, facilitator Dr. Bob Mortlock will provide a virtual professional development opportunity to walk through a case study of a real defense acquisition program in which speed was the #1 priority. Dr. Mortlock's case studies are based on real-world defense acquisition programs and have been published in peer-reviewed journal articles and/or technical reports. Students can place themselves in the case as the “protagonist,” ask themselves what they would do, and justify their recommendations based on facts presented in the case.



Who Can Join?

Anyone interested in understanding and improving defense acquisition from the practitioner perspective. The case study is directly applicable to Defense acquisition professionals, senior leaders and policy makers as well as program managers, business managers, engineers, and logisticians in the private commercial sector.

Register at our events website:

<https://event.nps.edu/conf/app/researchsymposium/home#!/page/347?c=53>

PAST EVENT: ACQUIRING EMERGING TECHNOLOGIES WEBINAR

On October 15, 2021, ARP hosted the webinar “**Acquiring Emerging Technologies.**” As the pace and complexity of new technologies increase, new challenges and opportunities arise for acquisition, development, deployment, and risk management processes. This webinar created a conversation about recent initiatives in and around the department, blending voices from the innovation ecosystem with the latest findings from technology researchers at NPS.



PANELISTS

- **Chris Manuel**, Director of NavalX Central Coast Tech Bridge at Naval Postgraduate School
- **Dr. Johnathan Mun**, NPS Professor of Research
- **VADM Dave Lewis (Ret.)**, Acquisition Chair at NPS
- **Mike Madsen**, Director of Strategic Engagement at Defense Innovation Unit

MODERATOR

- **Dr. Michelle Johnson**, ARP Communications Manager

What we learned: Modular open systems architecture (MOSA) is critical in this keeping pace with the development of new technologies. In MOSA, platforms or systems are designed separately from the technology, often software, that can operate on those platforms. Craft or components that have been designed with this open architecture, whether intentionally or not, remain useful because they are adaptable and updateable, in line with changing technologies that did not exist when they were built.

Watch the [recorded webinar](#) on our YouTube channel and read more about the event in our [blog post](#).

COLLABORATIONS

SPECIAL SECTION OF NAVAL ENGINEERS JOURNAL—NPS 18TH ANNUAL ACQUISITION RESEARCH SYMPOSIUM

The December 2021 issue of Naval Engineers Journal features a curated collection of articles from the 2021 symposium. Articles are introduced by VADM (Ret.) David H. Lewis, NPS Acquisition Chair, and include three papers from NPS faculty as well as long-time symposium participants:

- **Using Value Engineering to Propel Cyber-Physical Systems Acquisition**

Alfred R. Schenker, Nickolas H. Guertin

- **Framework for Augmenting Current Fleet with Commercially Available Assets for Logistics Support in Contested Environment**

Dr. Aruna Apte, Dr. Ken Doerr, Dr. Uday Apte

- **Risk-Based Modeling of Life-Cycle and Total Ownership Cost**

Dr. Johnathan Mun, LT Eliah Ledbetter (USN), LT Katelyn George (USN)



[Read the full issue.](#)

ARP-ADMINISTERED RESEARCH GRANTS

GRANTS

The following papers published in 2021 began with support from grants ARP administered on behalf of the Office of the Under Secretary of Defense for Acquisition and Sustainment:

ACQUISITION MANAGEMENT

[Assessing the Reliability of the Future Years Defense Program and Building a Forecast](#)

Andrew Hunter and Greg Sanders, Center for Strategic & International Studies

This project works to make the Future Years Defense Plan (FYDP) more accessible and more easily evaluated. It posits two hypotheses using FY 2018 budget request data: first that FYDP projections could estimate actual 2019 spending more reliably than the President's Budget alone, and second that the reliability of projections would vary between services. The simple regression model employed found that the two year out FYDP projections significantly improved the reliability of estimates for procurement line items and RDT&E program elements.

[Industrial Mobilization: Assessing Surge Capabilities, Wartime Risk, and System Brittleness](#)

Mark Cancian, Adam Saxton, Lee Ann Bryan, Owen Helman, and Nidal Morrison, Center for Strategic & International Studies

With the shift of U.S. strategic focus to great power competition, interest in industrial mobilization for a long-term, high-intensity conflict has returned. However, the highly consolidated and fragile U.S. defense industrial base is not designed to meet this challenge. To gain insight into the ability of the defense industrial base to meet the demands of great power conflict, the project first reviewed the history and literature on industrial mobilization and then analyzed the time needed to replace contemporary weapon systems' inventory at peacetime and surge production rates. The findings indicate that existing surge capacities for major defense acquisition programs fall short of what would be needed for a long-duration great power conflict.

[Buying for the Right Battle: Determining Defense Acquisition Strategies](#)

Amirhossein Etemadi, The George Washington University

The pace of technology and adversary change is pushing the Department of Defense to streamline acquisition processes and deliver products faster. These process changes can deliver capabilities sooner, but with greater risk, effort, and cost. In extreme cases, Rapid Acquisition Offices are used to deliver interim solutions typically within two years of request. Such responsiveness requires extraordinary effort

and leadership involvement to succeed. These rapid programs compete with existing programs for resources and priorities, meaning some still required programs will deliver required systems to the operating forces later and in smaller quantities than initially planned, unless changes are made to reduce their cycle times.

This research identified significant cycle-time factors related to acquisition strategies, the defense market and program objectives. A decision framework is presented to help program management offices identify historical program precedents and potential acquisition strategy modifications to meet changing program cycle time objectives.

[Is the Department of Defense a High-Risk Anomaly: Theory to Practice](#)

Douglas A. Brook and Danelle Gamble, Duke university

In phase one of this research, (Gamble, 2020, Brook 2020), DoD areas on the GAO's High-Risk List (HRL) were compared to similar longstanding high-risk non-Defense programs to determine if the DoD is a high-risk anomaly. Three attributes characterizing risk emerged: (1) the more technical programs have greater risk; (2) defense and national security areas have greater financial risk; (3) larger programs have greater, more prolonged risk. The study concluded DoD is a high-risk anomaly as the agency, and every area within, has two of the three attributes; but is not an anomaly in one as these attributes are present in non-Defense areas as well.

From this analysis questions emerged regarding whether the DoD can ever get off the HRL and whether the DoD should prioritize getting off the HRL. Additionally, we perceived a theory of interaction between the DoD, the GAO and Congress that would influence the answers. To explore these questions, we examined the interaction theory and its practice, and interviewed over twenty current and former officials and staff experts in the GAO, the DoD and on Capitol Hill. The analysis amplifies the earlier findings and reveals mixed and inconclusive views on whether the DoD could ever get off or should even prioritize getting off the HRL in its management agenda.

[Technology Transition Performance of the U.S. Department of Defense Small Business Innovation Research Program](#)

Toshiyuki Sueyoshi and Youngbok Ryu, New Mexico Tech

Sustainable public procurement plays an important role in addressing not only environmental but also economic and social issues through government acquisitions from technology-based small suppliers. In this context, the objective of this study is to better understand the holistic public procurement process by assessing the operational efficiency of technology-based small suppliers and associating the economic aspect of public procurement with the social aspect, such as women-owned businesses. To this end, we analyzed U.S. Department of Defense Small Business Innovation Research grantees by combining network data envelopment analysis with bootstrap truncated regression analysis. Drawing on the analysis

results, we found that (1) there is heterogeneity in the performance of research and development, network building, and commercialization sub-processes, and (2) there is a positive relationship between the overall performance and women-owned small suppliers who excel particularly in network building. The former implies that small suppliers may have different expertise in the chain of public procurement; the latter suggests that woman entrepreneurs with a business network may be able to outperform their counterparts in the public procurement market.

[Understanding and Modeling the Life-Cycle Cost Tradeoffs Associated with the Procurement of Open Systems](#)

Shao-Peng Chen, Peter Sandborn, and William Lucyshyn, University of Maryland

Openness (of a system or architecture), though intuitively understood, remains difficult to quantify in terms of its value. Although commonly associated with cost avoidance, system openness can also increase costs. Previous efforts have relied on highly qualitative system analyses, with the results often articulated as an intangible “openness score”, for determining which of multiple system implementations is more open. Such approaches do not provide enough information to make a business case or understand the conditions under which life-cycle cost avoidance can be maximized (or whether there even is cost avoidance). This report presents a multivariate model that quantifies the relationship between system openness and life-cycle cost. A case study that evaluates the Acoustic Rapid COTS Insertion (A-RCI) Sonar System is provided.

COST ESTIMATION

[Cybersecurity Acquisition Framework Based on Risk Management: Economics Perspective](#)

C. Ariel Pinto, Omer Faruk Keskin, Goksel Kucukkaya, Omer Ilker Poyraz, Abdulrahman Alfaqiri, Unal Tatar, and Ali Can Kucukozyigit, Old Dominion University

Cyber attacks continuously target organizations; however, the mitigation actions taken for defense are not sufficiently effective. Ability to compute the cost of attacks is crucial to assess the effectiveness of countermeasure investments. In this study, we developed a framework to have a well-informed decision-making process in cybersecurity acquisition by evaluating the business impact caused by the operability losses of assets. We tested the developed framework using various attack and mitigation scenarios. The findings suggest that using a simulation approach to calculate the business impact of cyber attacks provides the ability to support decision-making process.

[Improving Acquisitions In Science And Technology Programs: Creating Unique Cost Factors To Improve Resource Allocation Decisions](#)

Jonathan D. Ritschel, Eric A. Plack, Jordan S. Edwards, Edward D. White, Clay M. Koschnick, and Scott T. Drylie, Air Force Institute of Technology

Cost factors are a common technique employed in Major Defense Acquisition Program (MDAP) cost estimating. The extant suite of available factors, however, primarily consists of development factors from the Engineering and Manufacturing Development (EMD) phase of the life cycle. This study expands the set of factors available to analysts by producing cost factors germane to programs early in the life cycle (i.e., Science and Technology (S&T) programs) and creates factors for the Production phase of the life cycle.

The creation of factors for the production phase of the life cycle resulted in 1033 new cost factors from a multitude of diverse programs. Factors were developed by commodity type (aircraft, missile, UAV, space, and ship), contract type (various), contractor type (prime and sub), and Service (Air Force, Army, and Navy). Combining the results of the previous EMD factors developed (Markman et al., 2019) with the two new phases developed here (S&T; Production) results in a robust cost factor toolkit across the acquisition life cycle spectrum.

CONTRACT MANAGEMENT

[Trends in Department of Defense Other Transaction Authority \(OTA\) Usage](#)

Rhys McCormick and Greg Sanders, Center for Strategic & International Studies

The federal government's use of Other Transaction Authority (OTA) agreements has exploded in recent years, thanks in large part due to a surge in popularity within the Department of Defense (DoD). Neither a contract, grant, or cooperative agreements, OTAs are an acquisition approach that enable certain federal agencies to access goods and services outside of the traditional acquisition system. This research examines the trends in OTA usage across DoD to provide insights into what DoD is using OTAs for, how they are spending under an OTA, and to whom the majority OTA obligations go.

SYSTEMS ENGINEERING

[Phase 1: Investigation of Leading Indicators for Systems Engineering Effectiveness in Model-Centric Programs](#)

Donna H. Rhodes, Massachusetts Institute of Technology

Systems engineering practice is evolving under the digital engineering paradigm, including use of model-based systems engineering and newer approaches such as agile. This drives a need to re-examine the existing use of metrics and leading indicators. Early engineering metrics were primarily lagging measures, whereas more recent leading indicators draw on trend information to provide more predictive analysis of

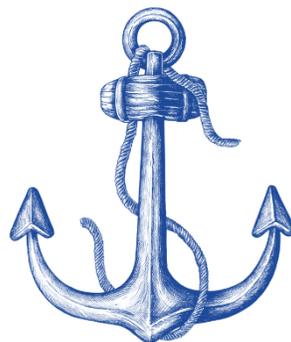
technical and programmatic performance of the engineering effort. The existing systems engineering leading indicators were developed under the assumption of paper-based (traditional) systems engineering practice.

This research investigates the model-based implications relevant to the existing leading indicators. It aims to support program leaders, transitioning to model-based engineering on their programs, in continued use of leading indicators. It provides guiding insights for how current leading indicators can be adapted for model-based engineering. The study elicited knowledge from subject matter experts and performed literature review in identifying these implications. An illustrative case was used to investigate how four leading indicators could be generated directly from a model-based toolset. Several recommendations for future research are proposed extending from results of the study.

Phase 2: Investigation of Leading Indicators for Systems Engineering Effectiveness in Model-Centric Programs

Donna H. Rhodes, Massachusetts Institute of Technology

Augmenting our Phase 1 research study on adapting and extending existing systems engineering leading indicators, this study takes a future orientation. This report discusses how base measures can be extracted from a digital system model and composed as leading indicators. An illustrative case is used to identify how the desired base measures could be obtained directly from a model-based toolset. The importance of visualization and interactivity for future leading indicators is discussed, especially the potential role of visual analytics and interactive dashboards. Applicability of leading-edge technologies (automated collection, visual analytics, augmented intelligence, etc.) are considered as advanced mechanisms for collecting and synthesizing measurement data from digital artifacts. This research aims to provide insights for the art of the possible for future systems engineering leading indicators and their use in decision-making on model-centric programs. Several recommendations for future research are proposed extending from the study.



FACULTY TECHNICAL REPORTS

Research supported by the Acquisition Research Program continues to make significant contributions to how we understand the data, people, and culture of defense acquisition. The second half of 2021 brought numerous successes from NPS faculty who are in the Department of Defense Management, have been supported by ARP, or both.

ACQUISITION MANAGEMENT

Dr. Randy Maule, [Acquisition Data Analytics for Supply Chain Cybersecurity](#).

Cybersecurity is a national priority, but the analysis required for acquisition personnel to objectively assess the integrity of the supply chain for cyber compromise is highly complex. This paper presents a process for supply chain data analytics for acquisition decision makers, addressing data collection, assessment, and reporting. The method includes workflows from initial purchase request through vendor selection and maintenance to audits across the lifecycle of an asset. Artificial intelligence can help acquisition decision makers automate the complexity of supply chain information assurance.

Jesse Cunha and Justin Marion, [Do Accelerated Payments for DoD Contractors Help Small Businesses?](#)

In 2011, the Department of Defense (DoD) set a goal of paying small business contractors within 15 days of invoice receipt rather than the standard 30 days. In 2012, other federal agencies also set a goal of accelerated payments to small businesses, and all agencies later expanded this goal to include all contractors regardless of size. We study whether small businesses benefited from these accelerated payment goals. Using a difference-in-difference design, we find that small business participation in government contracts rose following the setting of accelerated payments goals. Importantly, contracts for perishable foods and construction services, which were unaffected by the new accelerated payments policies, do not see an increase in small business participation. We also find that the benefits of accelerated payments are concentrated among small businesses with a backlog of ongoing projects. This is consistent with the hypothesis that accelerated payments alleviate the liquidity constraints that may be particularly acute for small businesses.

CONTRACT MANAGEMENT

Dr. Rene G. Rendon and Brett Schwartz, [An Innovative Approach to Assessing DoD Contracting Workforce Competency](#).

The National Defense Authorization Act (NDAA) of 2020 directed the secretary of defense to implement a professional certification program for all members of the acquisition workforce that is based on standards developed by a third-party accredited program based on nationally or internationally recognized standards. In response to this NDAA (2019) requirement, the Department of Defense (DoD) senior procurement executives agreed to the establishment of a new contracting competency model and a single level of certification program based on the National Contract Management Association's (NCMA) Contract Management Body of Knowledge (CMBOK; NCMA, 2019a) and American National Standards Institute-accredited Contract Management Standard (CMS; NCMA, 2019b). The purpose of this research is to develop a new competency assessment instrument based on the NCMA CMBOK and CMS to be used in assessing the DoD's contracting workforce competency. This research will answer the following question: How can the CMBOK/CMS competency structure be used as the basis for developing a survey-based instrument for assessing the competencies of the DoD contracting workforce? An additional research question is: Based on the competency assessment results, in which contract management competencies is the workforce less proficient and less knowledgeable? We conduct this research by developing a survey-based assessment instrument for assessing the competencies of the DoD contracting workforce. We then deploy the assessment instrument to DoD contracting organizations and analyze the assessment results to identify contract management competencies that need additional training emphasis.

PROGRAM MANAGEMENT

Dr. Charles Pickar and Raymond Franck, [It's about Time: Toward Realistic Acquisition Schedule Estimates](#).

This paper is part of a research agenda outlined in Franck, Hildebrandt and Udis (2016) – directed toward improving the realism of defense acquisition schedules. Defense acquisition schedules have long been a difficult problem. In this particular effort, we consider primarily the case of the 737MAX – which has been a fortuitous example of the risks of scheduling-by-fiat. We analyze the 737MAX misadventure using Systems Dynamics and Root Cause Analysis methods.

SYSTEMS ENGINEERING

Raymond Madachy and John (Mike) Green, [Naval Combat System Product Line Architecture Economics](#).

A Model-Based Systems Engineering (MBSE) approach has been developed at the Naval Postgraduate School that integrates parametric cost and product modeling methods for economic trade-off analysis of system product lines. The research assesses the economic consequences of DoD product line options and has been refining a framework for others to use and adapt. This report provides details of the methodology and its application to several empirical case studies.

The modeling framework includes a reference architecture and cost model for a general combat system product line that is extensible to other DoD and government domains. It has been applied to assess the economics of Navy combat system product line architecture approaches in coordinated case studies.

The case studies were performed for a three-tier cruise missile system, the Aegis ship software product line, and an Anti-Submarine Warfare (ASW) cross-domain product line architecture for air, surface, and sub-surface applications. An overall business case analysis for DoD product line practices was performed synthesizing the case studies with recommendations generated.

FACULTY RESEARCH & AWARDS

FACULTY PEER-REVIEWED PUBLICATIONS

The following faculty research reports were recently accepted for publication at peer-reviewed journals:

- **Brien T. Spencer, Robert J Eger, III** (2021). Exploring the Sub-state Intergovernmental Game, *Perspectives on Public Management and Governance*, 2021;, gvab015, <https://doi.org/10.1093/ppmgov/gvab015>
- **Robert F. Mortlock & J. L. Karnes** (2021). Aligning program management competencies to industry standards. *Defense Acquisition Research Journal*, 28(4), 366–419. Available at Defense Acquisition Research Journal #98: Reimagining Program Management (dau.edu) or at <https://doi.org/10.22594/10.22594/dau.21-868.28.04>
- **Juanita Rendon & Rene G. Rendon** (2021). "Analyzing procurement fraud in the US Navy", *Journal of Financial Crime*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JFC-09-2021-0207>
- **Robert F. Mortlock** (2021, Fall). Been there, done that: behavioral acquisition, *Army AT&L Magazine*, 140-145. Available at Fall 2021 :: 142 (army.mil). Published online and available at <https://asc.army.mil/web/news-been-there-done-that-behavioral-acquisition/>
- **David Lewis** (2021). "Innovation, Interrupted". *The Naval War College Review*. (Forthcoming)

- **Francois Melese** (2020). “New Insights in Defense Management from Transaction Cost Economics,” *Armed Forces Comptroller*, 65/4, pp. 36-8.
- **Robert F. Mortlock** (2021, Winter). Been there, done that: who is the customer? *Army AT&L*, 135-140. <https://asc.army.mil/web/news-been-there-done-that-who-is-the-customer/>
- **Robert F. Mortlock** (2021, Winter). ‘Big A’ acquisition: a primer. *Army AT&L*, 139. Published online on 15 Feb 2021 and available online at <https://asc.army.mil/web/news-big-a-acquisition-a-primer/>

FACULTY AWARDS

2021 DEPARTMENT OF DEFENSE MANAGEMENT RESEARCH EXCELLENCE AWARDS

Since coming to NPS as a military faculty in 2019, **Lt Col Daniel “Fink” Finkenstadt** has made significant impact to the Department of Defense through his intellectual contribution. He has worked as part of various COVID-19 response teams leading to impactful literature contributions in public health policy, contract management and **supply chain management in a post-COVID world**. Lt Col Finkenstadt has also published extensively on Defense-related areas such as vaccine cold-chain value chains, humanitarian logistics, countering human trafficking in defense contracting, **enhancing data literacy in acquisition personnel**, additive manufacturing acquisition models, and gamification of defense acquisition education and training.



Since joining NPS in 2019, **Paul B. Lester** has published 7 peer-reviewed journal articles and has already made a variety of important contributions. As an example, Paul served as the lead author in an empirical examination of how a **military service member’s well-being and optimism predicts objective performance** in their military occupations. This is by far the largest published study of its kind in its field and has a very good chance of becoming a highly cited article in years to come. In another example, he and his team published a study that showed the mechanisms by which **character development was positively and negatively shaped by combat exposure**. Paul’s work over the past three years has resulted in significant contributions to both his disciplinary field and to defense-focused research.



Since he arrived at NPS three years ago with no prior defense-focused research, **Daniel Reich** has worked on three projects that support defense. All three have yielded peer-reviewed journal publications, and two have included the development of software applications. For example, Daniel worked with Ira Lewis and three students on developing a **simulation-optimization model to choose risk-informed fleet compositions for brigade combat teams**. With Giovanna Oriti, he developed an application that helps installation energy managers evaluate alternative microgrid designs as they plan resilient energy infrastructure. With Bill Muir, he used machine learning and AI tools to build and deploy a predictive Product Service Code identification tool for government acquisition personnel. The web-based tool has sharply reduced the time spent by public officials in categorizing procurement transactions. This work has been recognized by the INFORMS professional community as a finalist for the 2021 Innovative Applications in Analytics Award.



OTHER NPS AWARDS

Dr. Chong Wang, The Louis D. Liskin Award for Teaching Excellence in the Graduate School of Defense Management (Spring 2021)

Philip J. Candreva, The Graduate School of Defense Management Executive Master of Business Administration Teaching Excellence Award (Summer 2021)

Dr. Erik Helzer, The Louis D. Liskin Award for Teaching Excellence in the Graduate School of Defense Management (Fall 2021)

MILITARY AWARDS

Maj Daniel Finkenstadt, USAF, The Military Officers Association of America Joint Service Warfare Award

Prof Paul Lester, The First Command Military Leadership Award

AWARD-WINNING PUBLICATION

Dr. Charles Pickar's article "Getting to a Win" was named Editors' Pick for Runner Up in the Best Commentary category of the ALTies Awards, which celebrates the best articles, commentaries, graphics and photographs that appeared in Army AL&T during 2020.

PROFESSOR PROFILE: DANIEL FINKENSTADT

Lt Col Daniel Finkenstadt (aka Fink) joined the NPS faculty in June 2020, and he hit the ground running as a partner with ARP, researcher, student advisor, and producer of smart initiatives. He is an alumnus of NPS and ARP, and we are thrilled to have him back on campus. He currently teaches MN3307 – Enterprise Innovation Design, MN3306 – Enterprise Sourcing, MN4374 – Capstone in Enterprise Sourcing, and previously taught MN3319-Spend analysis (discontinued) and MN4311-Service Contracting.

Prior to joining NPS, Fink was a PhD student at Kenan-Flagler Business School, UNC-Chapel Hill, NC. From 2016-2017 he was an action officer for SAF/AQC at the Pentagon. From 2011-2016 he worked for the National Reconnaissance Office. From 2010-2011 he was an MBA student at NPS.

You were a maintainer early in your career. How did that experience shape your approach to studying acquisition and defense management?

It taught me the importance of the operational mission. It also taught me the importance of quality control and checklists. BUT – checklists also showed me that there was a time/place for them. They matter when it comes to keeping an aircraft system up and running safely. They matter less when creatively thinking through how to solve an acquisition problem.

I was a metal fabricator (welder/machinist) before the Air Force and did art my whole childhood. I had a father who was a carpenter and build custom homes. He was really focused on details and perfection. I didn't get that from him, but I did get a sense of needing to build something out of every idea—I had to make it real. The eclectic mix of creative imagination with a regard for practical operational outcomes has served me well and suits acquisition.



Dan Finkenstadt

How did you get into the research field of acquisition?

My time at NPS and with the ARP in 2010-2011 introduced me to acquisition research. I worked on a large class project my last quarter at NPS (published Market Intel guide with ARP).

I kept working that topic after graduation and determined I liked acquisition research. It's really a natural fit for most contracting folks because we have to learn

Acquisition research is a natural fit for most contracting folks because we have to learn how to conduct basic research just to do our jobs

how to conduct basic research just to do our jobs, given all the regulation and diverse requirements we have to learn about just to know what we're buying.

How has ARP supported your research and professional development?

ARP has supported my Hacking for Defense (H4D) classes, my student projects, my personal MBA project when I was a student, and my recent desires to stand up a simulation and ideation lab at NPS. The SILAS, or Simulation and Ideation Lab for Acquisition Science, will focus on novel approaches to learning about acquisition science (such as games and VR) and testing out new techniques and procedures via simulation.

How does your research impact current acquisition or operational processes?

My research is kind of all over the place. We have projects that are exploring the edges of learning in acquisition (i.e., gaming) and we have research that is getting after practical supply chain problems (i.e., working with the Department of Health and Human Services Assistant Secretary for Preparedness and Response (DHHS/ASPR) for the future of Personal Protective Equipment (PPE) demand matching and requirements design).

You have many ongoing student research projects. Tell us about a few of the top projects and why you're excited about them.

So many. Obviously, I'm excited about teaming with NCSU, AIRC, ARP, DLI, and DAU on **games in acquisition training**. My students Matt Marshall, Lee Whitworth, and Ian Larsson started that with me last year and it has really got legs. I'm also super psyched about the work that Willis Crouch, LaDon Morris and Kevin Peaslee have done exploring federal spending in **areas of high risk for Human Trafficking**. Their work is getting DOD level attention and they briefed OFPP policy wonks and analysts on their findings and ideas. I have great projects with students related to **Data Literacy** (Sherry Jacobson), **Telework in contracting** (Therysa King and Lane Spinks) and **Additive Manufacturing business models** (Mitch Mickley, Pia Swank and Brett Hagen). Tons of cool stuff to keep me busy. In class I have students working directly with AFICC/KA and DHHS/ASPR to deliver robust market intelligence for the top 4 PPE categories that is being shared with the White House Task Force as we work it. We also did H4D again this Fall supporting DIU with a water study in collaboration with Cal-Berkeley and USAF with a security force study. Students are amazing!

What advice would you give students considering research in acquisition generally?

Don't be discouraged by the seeming lack of creativity in acquisition. That is just loads of opportunity. BUT at the same time resist the hype cycle. There are too many folks touting rapid this and X that, but aren't actually delivering on capabilities or delivering informative findings to support operations. Remember, acquisition can be interesting and exciting, as long as it leads to operational improvements. Innovation is important, but it isn't the point. Innovation is a way to find faster/better/smoothier ways to reach objectives. If you end up with a bunch of YouTube videos and haven't solved any real problems, then you move from being an innovator to being a good idea fairy. That drives me crazy, and I actively try not to be that as much as possible.

Put on your predicting hat: What kind of information and analysis do you think will be most needed by the acquisition community in the next 5 years?

Outcomes and post-award management. We have focused way too much on the buying side of acquisition and really need to move to the right of the process and think about the best ways to measure, manage and influence post award outcomes. Our past performance rating system is atrocious and needs a complete overhaul. We have to get legal on the change bus as well. There are too many things considered source selection sensitive that are just good common-sense things to have. For instance, why can't I see a quick summary of company X's past performance rating by agency, year and PSC? If they've done a good job, then there's nothing to hide; if not, THEY SHOULDN'T BE ABLE to hide it. If we were a company, we'd

PALT, cost savings and execution rates have next to zero to do with warfighting capability and everything to do with process.

be the worst company on the planet for not having the ultimate outcome data for each acquisition at our fingertips. PALT, cost savings and execution rates have next to zero to do with warfighting capability and everything to do with process.

In the past the idea was faster process = better outcomes. BUT that's only if you believe the outcome is the process. If you believe it's capability on time / on target...then process is secondary to product performance. **We have fundamentally misunderstood what value is and how to measure it systematically across our enterprise.** That has to be done in the next 5 years. AND we have to start adding really important components to the value metric like lifetime supply chain risk, total lifecycle costs – including disposal – and solutions-focused acquisition strategies vs. product-focused acquisition strategies that lock us into sole-source mental models that translate into elevated market risks.

