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Addressing Counterfeit Parts in the DoD Supply Chain

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Preface & Acknowledgements

Welcome to our Tenth Annual Acquisition Research Symposium! We regret that this year it will be a "paper only" event. The double whammy of sequestration and a continuing resolution, with the attendant restrictions on travel and conferences, created too much uncertainty to properly stage the event. We will miss the dialogue with our acquisition colleagues and the opportunity for all our researchers to present their work. However, we intend to simulate the symposium as best we can, and these *Proceedings* present an opportunity for the papers to be published just as if they had been delivered. In any case, we will have a rich store of papers to draw from for next year's event scheduled for May 14–15, 2014!

Despite these temporary setbacks, our Acquisition Research Program (ARP) here at the Naval Postgraduate School (NPS) continues at a normal pace. Since the ARP's founding in 2003, over 1,200 original research reports have been added to the acquisition body of knowledge. We continue to add to that library, located online at www.acquisitionresearch.net, at a rate of roughly 140 reports per year. This activity has engaged researchers at over 70 universities and other institutions, greatly enhancing the diversity of thought brought to bear on the business activities of the DoD.

We generate this level of activity in three ways. First, we solicit research topics from academia and other institutions through an annual Broad Agency Announcement, sponsored by the USD(AT&L). Second, we issue an annual internal call for proposals to seek NPS faculty research supporting the interests of our program sponsors. Finally, we serve as a "broker" to market specific research topics identified by our sponsors to NPS graduate students. This three-pronged approach provides for a rich and broad diversity of scholarly rigor mixed with a good blend of practitioner experience in the field of acquisition. We are grateful to those of you who have contributed to our research program in the past and encourage your future participation.

Unfortunately, what will be missing this year is the active participation and networking that has been the hallmark of previous symposia. By purposely limiting attendance to 350 people, we encourage just that. This forum remains unique in its effort to bring scholars and practitioners together around acquisition research that is both relevant in application and rigorous in method. It provides the opportunity to interact with many top DoD acquisition officials and acquisition researchers. We encourage dialogue both in the formal panel sessions and in the many opportunities we make available at meals, breaks, and the day-ending socials. Many of our researchers use these occasions to establish new teaming arrangements for future research work. Despite the fact that we will not be gathered together to reap the above-listed benefits, the ARP will endeavor to stimulate this dialogue through various means throughout the year as we interact with our researchers and DoD officials.

Affordability remains a major focus in the DoD acquisition world and will no doubt get even more attention as the sequestration outcomes unfold. It is a central tenet of the DoD's Better Buying Power initiatives, which continue to evolve as the DoD finds which of them work and which do not. This suggests that research with a focus on affordability will be of great interest to the DoD leadership in the year to come. Whether you're a practitioner or scholar, we invite you to participate in that research.

We gratefully acknowledge the ongoing support and leadership of our sponsors, whose foresight and vision have assured the continuing success of the ARP:

- Office of the Under Secretary of Defense (Acquisition, Technology, & Logistics)
- Director, Acquisition Career Management, ASN (RD&A)
- Program Executive Officer, SHIPS
- Commander, Naval Sea Systems Command
- Program Executive Officer, Integrated Warfare Systems
- Army Contracting Command, U.S. Army Materiel Command
- Office of the Assistant Secretary of the Air Force (Acquisition)
- Office of the Assistant Secretary of the Army (Acquisition, Logistics, & Technology)
- Deputy Director, Acquisition Career Management, U.S. Army
- Office of Procurement and Assistance Management Headquarters, Department of Energy
- Director, Defense Security Cooperation Agency
- Deputy Assistant Secretary of the Navy, Research, Development, Test, & Evaluation
- Program Executive Officer, Tactical Aircraft
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- Director, Office of Acquisition Resources and Analysis (ARA)
- Deputy Assistant Secretary of the Navy, Acquisition & Procurement
- Director of Open Architecture, DASN (RDT&E)
- Program Executive Officer, Littoral Combat Ships

James B. Greene Jr. Keith F. Snider, PhD
Rear Admiral, U.S. Navy (Ret.) Associate Professor

Logistics Management

Fully-Burdened Cost of Supply in Self-Sustaining Logistics Networks

Eva Regnier, Jay Simon, Daniel Nussbaum, Aruna Apte, and John Khawam
Naval Postgraduate School

Platform Design for Fleet-Level Efficiency: Application for Air Mobility Command (AMC)

Jung Hoon Choi, Parithi Govindaraju, Navindran Davendralingam, and William A. Crossley
Purdue University

Improving DoD Energy Efficiency: Combining MMOWGLI Social-Media Brainstorming With Lexical Link Analysis (LLA) to Strengthen the Defense Acquisition Process

Ying Zhao, Don Brutzman, and Douglas J. MacKinnon
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Addressing Counterfeit Parts in the DoD Supply Chain

Jacques S. Gansler, William Lucyshyn, and John Rigilano
University of Maryland

Wave Release Strategies to Improve Service in Order Fulfillment Systems

Erdem Çeven and Kevin Gue
Auburn University

Issues and Challenges in Self-Sustaining Response Supply Chains

Aruna Apte, John Khawam, Eva Regnier, Jay Simon, and Daniel Nussbaum
Naval Postgraduate School

Lead Time Demand Modeling in Continuous Review Supply Chain Models

Barry R. Cobb, *Virginia Military Institute*
Alan W. Johnson, *Air Force Institute of Technology*

Improving Multi-Component Maintenance Acquisition With a Greedy Heuristic Local Algorithm

Sifat Kalam and Kash Barker, *University of Oklahoma*
Jose Emmanuel Ramirez-Marquez, *Stevens Institute of Technology*

An Internal, Demand-Side Approach Toward Implementing Strategic Sourcing:

Political, Legal, and Economic Considerations

John Fallon, *University of Maryland, University College*
Timothy Reed, *Beyond Optimal Strategic Solutions*

Optimizing Causes of Procurement Cost Through Strategic Sourcing: The Impact of Rate, Process, and Demand

Timothy Reed, *Beyond Optimal Strategic Solutions*
Michael E. Knipper, *United States Air Force*
John Fallon, *University of Maryland, University College*

Addressing Counterfeit Parts in the DoD Supply Chain[1]

Jacques S. Gansler—The Honorable Jacques S. Gansler, former Under Secretary of Defense for Acquisition, Technology, and Logistics, is a professor and holds the Roger C. Lipitz Chair in Public Policy and Private Enterprise in the School of Public Policy, University of Maryland; he is also the director of the Center for Public Policy and Private Enterprise. As the third-ranking civilian at the Pentagon from 1997–2001, Dr. Gansler was responsible for all research and development, acquisition reform, logistics, advance technology, environmental security, defense industry, and numerous other security programs. Before joining the Clinton Administration, Dr. Gansler held a variety of positions in government and the private sector, including Deputy Assistant Secretary of Defense (Material Acquisition), Assistant Director of Defense Research and Engineering (Electronics), senior vice president at TASC, vice president of ITT, and engineering and management positions with Singer and Raytheon Corporations.

Throughout his career, Dr. Gansler has written, published, testified, and taught on subjects related to his work. He is the author of five books and over 100 articles. His most recent book is *Democracy's Arsenal: Creating a 21st Century Defense Industry* (MIT Press, 2011).

In 2007, Dr. Gansler served as the chair of the Secretary of the Army's Commission on Contracting and Program Management for Army Expeditionary Forces. He is a member of the Defense Science Board and the Government Accountability Office Advisory Board. He is also a member of the National Academy of Engineering and a fellow of the National Academy of Public Administration. Additionally, he is the Glenn L. Martin Institute Fellow of Engineering at the A. James Clarke School of Engineering; an affiliate faculty member at the Robert H. Smith School of Business; and a senior fellow at the James MacGregor Burns Academy of Leadership (all at the University of Maryland). From 2003–2004, Dr. Gansler served as interim dean of the School of Public Policy at the University of Maryland, and from 2004–2006, he served as Vice President for Research at the University of Maryland. [jgansler@umd.edu]

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Introduction

In June 2007, the U.S. Department of the Navy, Naval Air Systems Command (NAVAIR), asked the Bureau of Industry and Security's (BIS) Office of Technology Evaluation (OTE) to conduct a defense industrial base assessment of counterfeit electronics. NAVAIR suspected that an increasing number of counterfeit/defective electronics was infiltrating the DoD supply chain and affecting weapon system reliability. OTE data revealed that 39% of companies and organizations participating in the survey encountered counterfeit electronics during the four-year study period. Moreover, the

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[1] This is a summary of the full report, which will be available in July 2013.

frequency of detected counterfeit incidents was escalating rapidly, rising from 3,868 incidents in 2005 to 9,356 incidents in 2008. These counterfeit incidents included multiple versions of DoD qualified parts and components (U.S. Department of Commerce, 2010).

Today, the DoD procures systems and products from a large network of global suppliers and manages over four million different parts at a cost of over $94 billion (GAO, 2010). As the DoD draws from this increasingly global supplier base, its visibility into these source companies is often limited; quality controls are, at times, insufficient; and chain of custody verification is lacking. As a result, the challenge of assuring the integrity and provenance of parts and components has grown geometrically more complex in this global sourcing environment.

When they are installed in systems, counterfeit parts and components can affect the safety, operational readiness, cost, and critical nature of the military mission. Almost any part can be counterfeited—including fasteners used on aircraft, electronics used on missile guidance systems, and materials used in body armor and engine mounts. Counterfeit parts have the potential to cause a serious disruption to DoD supply chains, delay ongoing missions, and even affect the integrity of weapons systems (GAO, 2010).

Additionally, as DoD weapon systems age, products required to support them may no longer be available from the original manufacturers or through franchised or authorized suppliers. Instead, the DoD must turn to independent distributors, brokers, or aftermarket manufacturers as sources of supply. Here again, the DoD is at risk for acquiring counterfeit parts.

At the same time, counterfeiters continue to develop more sophisticated capabilities, making detection all the more difficult. For instance, third-party subcontractors for major defense companies have been found to manufacture working components, only to mix them with cheaper parts of inferior quality and/or non-working components. Needless to say, schemes of this sort make determining the provenance of counterfeit components exceedingly difficult.

Over the years, counterfeiters have also fine-tuned their ability to replicate parts, often by relying on scrap materials that were thought to have been destroyed (Martin, 2012). The burgeoning practice of harvesting and, often, repurposing electronic waste or "e-waste" (e.g., discarded computers, office electronic equipment, entertainment device electronics, mobile phones, telephones, and refrigerators) poses a growing challenge to the DoD. In the slums of China, India, and Pakistan, peasants "cook" circuit boards over trash can fires in order to remove the metal chips, selling them to local counterfeiting operations. Once the chips are cleaned, refurbished, and relabeled, they are purchased by unscrupulous military subcontractors that go on to supply "military grade" microchips to many of America's largest defense companies. According to a 2012 GAO report, some of these microchips are then used in some of the DoD's major weapons systems.

In this environment, the DoD must step up its war against counterfeit parts, much as private industry has done. For example, counterfeit drugs are rare (at least in the United States) thanks to the relatively high level of safety assuredness for U.S. pharmaceuticals (Lechleiter, 2012). This includes the review of production yields, capacity, and/or product amounts compared with raw material purchases. Given the relative ease with which authentic-looking drugs can be reproduced (indeed, reproducing packaging is more expensive than making the fake drug), it is remarkable that there are so few reported instances of counterfeits.

Across the DoD supply chain, however, counterfeits of all types—from electronic equipment to metal fasteners—have been found. As a direct consequence, the lives of military men and women are at stake. Thus far, the impact of counterfeit parts has been minimal in this regard. According to Pentagon Press Secretary, George Little, "[the DoD] is unaware to date of any loss of life or catastrophic mission failure that has occurred because of counterfeit parts" (Garamone, 2012, p. 1). But given the growth of the availability of counterfeit parts, it may only be a matter of time.

All branches of the Services are affected by the threat of counterfeit parts. The following examples illustrate cases in which counterfeit parts have infiltrated the Services' supply chains (GAO, 2010).

- **Army: Seatbelt clasps.** Seatbelt parts were made from a grade of aluminum that was inferior to that specified in the DoD's requirements. The parts were found to be deficient when the seatbelts were accidentally dropped and they broke.

- **Navy: Routers.** The Navy, as well as other DoD and government agencies, purchased counterfeit network components—including routers—that had high failure rates and the potential to shut down entire networks. A two-year FBI criminal investigation led to 10 convictions and $1.7 million in restitution.

- **Air Force: Microprocessor.** The Air Force needed microprocessors that were no longer produced by the original manufacturer for its F-15 flight-control computer. These microprocessors were procured from a broker, and F-15 technicians noticed additional markings on the microprocessor and character spacing inconsistent with the original part. A total of four counterfeit microprocessors were found and as a result were not installed on the F-15's operational flight control computers.

- **Defense Logistics Agency: Packaging and small parts.** During a two-year period, a supplier and three co-conspirators packaged hundreds of commercial items from hardware and consumer electronics stores and labeled them as military-grade items. For example, a supplier labeled the package containing a circuit from a personal computer as a $7,000 circuit for a missile guidance system. The suppliers avoided detection by labeling packages to appear authentic, even though they contained the wrong part. The supplier received $3 million from contracts totaling $8 million before fleeing the country.

Defense contractors are encouraged to report counterfeits using the Government Industry Data Exchange Program (GIDEP) database. GIDEP serves as a data repository for the collection and sharing information on nonconforming parts and materials, including information on suspect counterfeit products, allowing government and industry participants to share information. However, not all participants are willing to share such information. This is not surprising given the lack of clear incentives, especially if the participating firm believes their reputation may be damaged as a result.

In order to reduce the risk of counterfeit parts in the DoD supply chain, we provide the following high-level recommendations:

- Partner with industry to develop a network of trusted providers.

- Mandate that suppliers report suspect counterfeits using GIDEP and provide penalties for non-compliance.

- Require that the supplier absorb any costs associated with the removal and replacement of counterfeit parts or components that make their way into DoD systems.

- Invest in visibility systems to track the provenance and transport of parts and components.

- Adopt regionalized supply chains to reduce supplier and transport risk.

The threat of counterfeit parts within the DoD's supply chain is real and will only escalate over time, with potentially serious consequences. In order to reduce this threat, the DoD and its industry partners will have to work together. While both may have the best intentions, it is essential that incentives, penalties, and rewards are properly aligned in order to produce the desired outcome.

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