



Risk Mitigation Consulting Inc.

Intelligence and Analysis Division

WHITE PAPER SERIES

DoD Supply Chain Disruptions

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INTENT

This white paper is designed to provide analysis of relevant, publicly available information on threat and hazard events/trends and their potential impacts to the interests of the United States, both at home and abroad. This product is not intended to be an all-encompassing assessment of the subject.



DoD Supply Chain Disruptions

Introduction

The 2021 supply chain crisis has had severe negative impacts on many organizations worldwide¹. Among those organizations being negatively impacted is the United States Department of Defense (DoD). The DoD supply chain brings in extremely important materials and equipment that support all military operations. The crippled supply chain is leading to many issues on military installations as critical maintenance or replacements are unable to be performed due to a shortage of parts. The current conditions causing supply chain challenges have the potential to worsen over time², leading to additional problems and the increased potential to further impair the DoD's ability to perform critical functions.

Supply Chain Crisis Overview

Due to conditions arising from the Covid-19 pandemic, issues with the global supply chain have come about mainly involving shipping processes in the Pacific Ocean. There is currently a massive build-up of container ships off of the coast of Los Angeles, unable to dock and unload cargo.³ Open Source research indicates roughly 100 ships were waiting to dock as of 5 December 2021.⁴ Other factors, such as a Covid-19 case spike in India, exacerbate supply chain issues and also lead to additional problems.⁵ Many types of goods are in short supply as the quantity of supply is unable to meet the quantity of demand. This crisis has negatively impacted the DoD since the department has not been able to import vital materials and equipment. As a result, general military readiness has decreased, with potential negative national security ramifications.

Effects of Disruptions to the DoD Supply Chain

The DoD supply chain supplies crucial materials and equipment from defense contractors to the armed forces that service members use every day to continue their operations. When the supply chain is disrupted, as older equipment cannot be replaced, new equipment is prevented from being constructed, and equipment is unable to be repaired. This leads to an influx of aged military equipment on installations that are more prone to accidental disruptions such as breaking down or becoming inoperable. Since the equipment is unable to be repaired, operations are more likely to be negatively impacted, causing the installation to be less productive and potentially more vulnerable to other risks and threats. For example, engine failures in base vehicles that are unable to be repaired due to a shortage of new parts decrease productivity and leave the base vulnerable to events such as medical emergencies that are unable to be transported to the hospital.⁶

Case Studies

The following case studies seek to highlight the effects of the ongoing supply chain crisis regarding the DoD. These case studies are not in any particular order and additional ones may exist or materialize in the future.



Rare Earth metals

Rare earth metals are used in the production of many different types of equipment necessary to military operations. They are used in almost all electronics, such as audio and video communications equipment, computers, and vehicles. In addition, tank armor often utilizes depleted uranium in its armor in order to better protect it from projectiles and explosives. Rare earth metals are also used in the production of microchips.⁷ A lack of rare earth metals would prevent crucial equipment from being produced and thus negatively impact operations. For example, a tank that lacks depleted uranium armor would be more susceptible to being damaged by an attack, or a unit may not be able to operate due to a shortage of communications equipment. China controls over 90% of the global rare earth metals supply, which leads to problems in its own right regarding supply chain security.³ However, the current crisis is related to importing materials from overseas locations, as is being done from China. Rare earth metals shortages are deeply damaging to military operations and the risks to the supply lines that ship them in must be mitigated.⁸

Microchips

Microchips are used in many defense applications and are crucial to the operation of many types of electronic equipment. Microchips serve as processors for many types of computers, such as those used in vehicles, communications equipment, and weapons targeting systems such as those on missiles.⁹ There is a major microchip shortage currently that is preventing many types of products from being manufactured.¹⁰ Without the necessary number of microchips to manufacture defense equipment, U.S. military installations worldwide could potentially face a shortage of mission critical machinery and appliances. The issue has elevated to a severe enough level that the White House has twice considered this year invoking the Defense Production Act to secure supply chain lines for mission-critical microchips.¹¹

Medication

General healthcare is a vital component of the DoD. Lack of healthcare contributes to a decline of readiness among the military. In order to provide quality and timely healthcare, medical equipment and medication are necessary. Amid the supply chain crisis, the DoD has been able to sustain a supply of medication and equipment in order to maintain healthcare services.¹² This is an example of a successful response to the crisis and is a strength of the DoD. However, many other hospitals in the country have not been able to do the same and are facing major medication and equipment shortages that are impacting the quality and amount of care they can provide to the general public.¹³ The stark difference in the impact of the supply chain crisis on the DoD and civilian hospitals speaks to the strengths of the DoD in this specific area.

F-35 Engines

Recently there has been a shortage of F-35 engines across the globe. F-35 fighter jets are one of the newest, most versatile planes that the U.S. military has at its disposal. The DoD is extremely reliant on them for a variety of uses, and an insufficient quantity of engines would cripple the United States and its ability to conduct critical operations around the globe. In addition, many important U.S. allies around the globe utilize the F-35, including Israel and Australia.¹⁴ This engine shortage could impact 20% of the fleet by 2022. Since F-35 engines already experience degradation problems such as “premature distress of rotor blade coatings”, this issue is more



challenging than it otherwise would be.¹⁵ Supply chain challenges related to the maintenance and replacement of F-35 engines must be examined and solved in order to enable the continuation of critical U.S. and allied defense operations globally.

Outlook

The supply chain crisis is expected to continue into 2022, and other industries are expected to be impacted for years to come.¹⁶ Supply chain problems lead to a variety of secondary problems that have the possibility of deeply compromising military installations. For example, the DoD may have to switch vendors on short notice due to supply chain challenges. Switching vendors leads to other challenges, such as exploitation of the switchover for malicious reasons, or mistakes made on the vendor or the vendor's supplier's behalf.¹⁷ For instance, Aventura Technologies, a New York tech company that claimed to produce high-tech CCTV cameras, sold cameras to dozens of military installations. These cameras later turned out to be not produced in America, as was previously claimed, but produced in China, which greatly compromised the security of the installations.¹⁸ Another incident of a supplier mishap occurred over the last few decades with the steel supplier Bradken. A metallurgist at the company falsified test results that were meant to ensure the durability and strength of steel, steel which was later sold to the U.S. Navy for the use of manufacturing submarines.¹⁹ Although the motivating factor behind these incidents was greed or laziness, they highlight the possibility of what could happen if the actor's intent was more malicious. The probability of other forms of disruptions occurring is also increased during vendor changeovers, such as accidental disruptions due to maintenance issues. The current crisis has highlighted strengths and weaknesses of the DoD supply chain that must be taken advantage of, or conversely, prepared for and mitigated in both the short and long term.



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² Bertuca, T. (2021, October 27). *DOD under pressure as contractors prep for possible disruptions triggered by Vaccine Mandate*. Inside Defense. Retrieved December 10, 2021, from <https://insidedefense.com/daily-news/dod-under-pressure-contractors-prep-possible-disruptions-triggered-vaccine-mandate>.

³ Goodman, P. S. (2021, October 22). *How the Supply Chain Broke, and Why It Won't Be Fixed Anytime Soon*. *The New York Times*.

⁴ Miller, G. (2021, December 5). *It's official: 96 container ships are waiting to dock at SoCal ports*. <https://www.freightwaves.com/news/its-official-96-container-ships-waiting-to-dock-in-southern-california-ports>

⁵ *Risks to DoD Supply Chain*. Risk Mitigation Consulting. (2020, June). Retrieved December 9, 2021, from <https://riskmitigationconsulting.com/uploads/media/intel-reports/White%20Papers/2020/Risk%20to%20DoD%20Supply%20Chain%20-%20June%202020.pdf>.

⁶ Vergun, D. (2020, September 29). *DOD takes steps to Safeguard Supply Chain*. U.S. Department of Defense. Retrieved December 9, 2021, from <https://www.defense.gov/News/News-Stories/Article/Article/2365123/dod-takes-steps-to-safeguard-supply-chain/>.

⁷ Parman, R. (2019, September 26). *An elemental issue*. www.army.mil. Retrieved December 9, 2021, from https://www.army.mil/article/227715/an_elemental_issue.

⁸ Under Secretary of Defense. (2012, March 7). *Report to Congress - Rare Earth Metals in Defense Applications*. Homeland Security Digital Library. Retrieved December 9, 2021, from <https://www.hsdl.org/?view&did=704803>.

⁹ McSweeney, K. (2021, September 24). *The brains behind Military Electronics: Custom Asic Chips*. Northrop Grumman. Retrieved December 9, 2021, from <https://www.northropgrumman.com/what-we-do/advanced-technology-and-innovation/the-brains-behind-military-electronics-custom-asic-chips/>.

¹⁰ Maithel, P. (2021, November 8). *Global microchip shortage in automotive industry reinforces need for better supply chain planning*. *diginomica*. Retrieved December 10, 2021, from



<https://diginomica.com/global-microchip-shortage-automotive-industry-reinforces-need-better-supply-chain-planning>.

¹¹ Murphy, M. (2021, September 24). *White House again raises using Defense Act to address chip shortage: Report*. MarketWatch. Retrieved December 10, 2021, from <https://www.marketwatch.com/story/white-house-again-raises-using-defense-act-to-address-chip-shortage-11632445117>.

¹² Jowers, K. (2021, October 24). *Despite drug shortages, military has mostly been able to find alternative supplies*. Military Times. Retrieved December 10, 2021, from <https://www.militarytimes.com/pay-benefits/2021/10/23/despite-drug-shortages-military-has-mostly-been-able-to-find-alternative-supplies/>.

¹³ Mark, M. (2021, October 21). *Hospitals struggle with drug shortages as supply chain issues persist*. CBS News. Retrieved December 10, 2021, from <https://www.cbsnews.com/news/hospitals-struggle-with-drug-shortages-as-supply-chain-issues-persist/>.

¹⁴ White, S. (2021, June 19). *How the F-35 has reshaped the strategic balance in Europe*. How the F-35 has Reshaped the Strategic Balance in Europe. Retrieved December 10, 2021, from <https://www.f35.com/f35/news-and-features/how-the-f35-has-reshaped-strategic-balance-in-europe.html>.

¹⁵ Insinna, V. (2021, February 19). *An engine shortage is the newest problem to hit the F-35 Enterprise*. Defense News. Retrieved December 10, 2021, from <https://www.defensenews.com/air/2021/02/12/an-engine-shortage-is-the-newest-problem-to-hit-the-f-35-enterprise/>.

¹⁶ Landsman, S. (2021, November 15). *Top tech investor Paul Meeks won't put new money to work in Apple and other Faang names, blames chip shortage that could extend through 2023*. CNBC. Retrieved December 10, 2021, from <https://www.cnbc.com/2021/11/14/supply-chain-chaos-chip-shortage-could-go-through-2023-paul-meeks-.html>.

¹⁷ *The Security Implications of Foreign Hardware/Software*. Risk Mitigation Consulting. (2019, February). Retrieved December 9, 2021, from <https://riskmitigationconsulting.com/uploads/media/intel-reports/White%20Papers/2019/The%20Security%20Implications%20of%20Foreign%20Hardware%20Software%20-%20February%202019.pdf>.



¹⁸ Osborne, C. (2019, November 8). *Aventura charged for flogging Chinese spy equipment to us gov't with security vulnerabilities*. ZDNet. Retrieved December 10, 2021, from <https://www.zdnet.com/article/firm-charged-for-flogging-chinese-spy-equipment-to-us-govt-with-known-security-vulnerabilities/>.

¹⁹ Jiménez, J. (2021, November 8). *Metallurgist admits she falsified test results for steel ...* The New York Times. Retrieved December 10, 2021, from <https://www.nytimes.com/2021/11/08/us/metallurgist-navy-false-steel-tests.html>.