

# **NDIA** TOP LINE SUMMARY OF THE 2018 DEFENSE INDUSTRIAL BASE STUDY

## **ASSESSING AND STRENGTHENING THE MANUFACTURING AND DEFENSE INDUSTRIAL BASE AND SUPPLY CHAIN RESILIENCY OF THE UNITED STATES**

The Defense Department has just released a study on the health and resiliency of the defense industrial base. As directed in Executive Order 13806, signed July of 2017, the report directed the Secretary of Defense to conduct a government-wide examination of risks, impacts and proposed recommendations to ensure a healthy manufacturing and industrial base.

### **FIVE MACRO FORCES**

Findings from a micro-level sector analyses of the working groups found that there are **FIVE MACRO FORCES CURRENTLY DRIVING THE RISKS TO THE INDUSTRIAL BASE.**

#### **1. SEQUESTRATION AND UNCERTAINTY OF GOVERNMENT SPENDING**

levels leave companies with unpredictable markets, negatively impacting their ability to forecast revenue, discourage them from investing in new capabilities and R&D, and create risks for companies undertaking capital intensive investments. With confirmed investments, suppliers will take on high fixed costs to develop new capacity to meet programmatic needs but when programs draw down, companies can be left with excess capacity and high costs. This creates a “bullwhip effect” that is felt across the entire supply chain.

- The Rand Corp found that unpredictability in ship maintenance reduces incentives to invest in facilities and human capital, delaying modernization and putting future surge maintenance capabilities at risk.
- The Center for Strategic and International Studies estimates that from 2001 to 2015, 17,000 companies ceased to be prime vendors for Defense Department.
- In 2017 alone, there were 75 new programs within the Defense Department that could not be executed because of the uncertainty of operating under a Continuing Resolution.

**2. DECLINING US MANUFACTURING BASE** capabilities and capacity cuts at the core of the US military technical advantage. From 1979 to 2017, the US lost 7.1 million manufacturing jobs, 36% of the industry’s workforce, with more than 5 million manufacturing jobs and 66,000 manufacturing facilities lost since 2000 alone. The share of employment attributed to manufacturing has decreased from more than 30% in 1970 to only 10% in 2017. The report finds that loss in domestic manufacturing capabilities has reduced technical innovation, deterred investments in next-generation manufacturing and created dependencies on foreign sources.

- China’s strategic subsidizing of rare-earth materials, used for things such as lasers, radar and missile guidance, has created a vulnerability by driving out domestic competitors and deterred new market entrants.

- Reliance on the import of electronic equipment has driven lower yields, higher rates of failure in downstream production and increased the risk of “trojan” chips infiltrating US defense systems.
- Since 2000, the shipbuilding industries have been particularly impacted, losing more than 20,500 establishments and completely eliminating competition in a number of areas.
- While the US once led the world in the production of high-end machine tools required for manufacturing processes, China now accounts for over 40% of the total global consumption and producers have shifted production locations away from the US to more easily serve the growing Chinese market.

#### **3. DELETERIOUS GOVERNMENT BUSINESS AND PROCUREMENT PRACTICES**

create complex relationships between industry and government, often requiring lengthy negotiations, the use of bespoke accounting standards and a burdensome security clearance process. Efforts like the Section 809 Panel represent a bright-spot in the Defense Department’s efforts to improve the process but the median time for developing a major defense acquisition program has remained steady at 8 years since the 1980s. The current system of requirements-driven acquisition solicits solutions for specific capabilities rather than for outcomes, potentially imposing an opportunity cost on innovation.

**4. INDUSTRIAL POLICIES OF COMPETITOR NATIONS** have created an unfair and non-reciprocal trade environment. China remains a focus of the ever-changing economic playing field. Since 2001, the Chinese GDP has grown more than 300% while military spending has increased from \$20 billion to \$170 billion in 2017 and the US trade deficit with China has grown from \$83 billion to \$375 billion over that same period. Chinese business practices requiring conditional access and tech transfer have increased their dominance in global markets and the risk they post to the supply of materials and tech deemed strategic and critical to US national security. Chinese investment in developing countries adds a key level of consideration to the threat to American economic and national security and those of our allies such as Germany and Australia. China’s current 5-year plan calls for increasing its R&D spending to 2.5% of GDP up from 2.1% in 2011-2015, meaning that they will likely reach parity with the US in the near future.

- China’s aggressive industrial policies have eliminated some capabilities with critical defense functions including solar cells for military use, flat-panel aircraft displays, and the processing of rare earth elements
- In multiple cases, the sole remaining domestic producer of materials critical to DoD are on the verge of shutting down

their US factory and importing lower cost materials from the same foreign producer country that is forcing them out of domestic production.

- 90% of the world's printed circuit boards are printed in Asia, half being produced in China.
- China's cumulative foreign direct investment in the US since 2000 now exceeds \$100 billion

**5. DIMINISHING US STEM AND TRADE SKILLS** damage the holistic and synergistic health of the defense ecosystem. From 2006 to 2016, STEM occupations experienced a 52% growth but the population of STEM-field workers age 35-44 decreased, endangering the knowledge transfer from older to mid-career workers.

- The Manufacturing Institute and Deloitte did a study showing that Gen Y respondents (ages 19-33) ranked manufacturing as their least preferred career destination.
  - 79% of executives surveyed stated it is moderate to extremely challenging to find candidates to pass initial screening or probationary periods.
- While the US graduates the largest number of doctoral recipients of any country, 37% were given to temporary visa holders, 25% to Chinese nationals.

## TEN RISK ARCHETYPES

The report identified **TEN RISK ARCHETYPES THAT THREATENED THE MANUFACTURING AND DEFENSE INDUSTRIAL BASE**. Negative impacts of these archetypes include reduced investment in both new capital and R&D; concomitant reductions in the rates of modernization and technological innovation; a loss in suppliers and potential bottlenecks across the many tiers of the supply chain; and lower quality and higher prices resulting from reduced competition. At the production level, negative impacts of cost inefficiencies, deferred maintenance, reduced reliability and increased vulnerability to counterfeit components was also cited.

**1. SOLE SOURCE:** Only one supplier is able to provide the required capability resulting in reduced competition, lack of innovation, and potential of single points of failure in production.

Policy requirements require that all large caliber gun barrels must be manufactured at a single organic arsenal, resulting in a single production line for all these items (which currently does not have the capacity to meet current demands).

**2. SINGLE SOURCE:** Only one supplier is qualified to provide the required capability as oppose to a sole source where there is only one supplier in existence.

Examples of single source suppliers are prevalent in the Navy, where they rely on single source suppliers for a number of critical components and ammonium perchlorate (relied on for propulsion systems) which only has one domestic producer.

**3. FRAGILE SUPPLIER:** A specific supplier is financially challenged and/or distressed in the current market.

Examples include domestic textile suppliers able to meet the specific material requirements of defense-specific textiles and rotary wing producers required to produce helicopters for the Marine Corps.

**4. FRAGILE MARKET:** Structurally poor industry economics; potentially approaching domestic extinction.

Example: Since 2000, the US has seen a 70% decline in its share of circuit board production.

**5. CAPACITY CONSTRAINED SUPPLY MARKET:** Capacity is unavailable in required quantities or time due to complete market demands, potentially creating schedule slips and impacting warfighting capability.

Example of ASZM-TEDA1 impregnated carbon is a defense-specific product that relies on a single point of failure – current capacity has resulted in a backlog of repair work across the Navy's nuclear and non-nuclear fleet

**6. FOREIGN DEPENDENCY:** Domestic industry does not produce the product or does not produce it in sufficient quantities to meet demand.

Examples include specialty chemicals used in munitions and missiles which are only produced in China or proprietary carbon fibers that only come from Japan or Europe.

**7. DIMINISHING MANUFACTURING SOURCES & MATERIAL SHORTAGES (DMSMS):** Product or material obsolescence resulting from decline in relevant suppliers. The military is highly dependent on the commercial sector for tech maturation, but the commercial sector is driven by revenue and high-volume tech demands, leaving development of tech for military specific purposes often un-feasible

Trusted foundries, obsolescence, diminishing manufacturing sources and material shortages, and counterfeit issues are common to the broad defense electronics sector.

**8. GAP IN U.S.-BASED HUMAN CAPITAL:** Industry is unable to hire or retain U.S. workers with the necessary skill sets because the education pipeline is not providing the necessary resources to fully meet the current or future demands in the commercial sector or defense ecosystem.

In 2017 a study of 622 manufacturing companies by the National Association of Manufacturers found that 72.9% of respondents cited an inability to attract and retain quality workers

**9. EROSION OF U.S.-BASED INFRASTRUCTURE:** Loss of specialized capital equipment needed to integrate, manufacture, or maintain capability continues to impact turnaround time and repair costs of new weapons systems, a reduction in inventory, and a decrease in operational readiness. Without significant future investment, the organic base will remain challenged by outdated equipment, tooling, and machinery

**10. PRODUCT SECURITY:** Lack of cyber and physical protection results in eroding integrity, confidence, and competitive advantage.

## A BLUE PRINT FOR ACTION

The report concludes by providing a **BLUEPRINT FOR ACTION** directed at actors across the government, detailing current and future efforts necessary to ensure the health of the manufacturing and industrial base.

### THE EFFORTS CURRENTLY UNDERWAY INCLUDE:

Increased near-term DoD budget stability with the passage of the Bipartisan Budget Act of 2018, providing stable funding through FY2019.

Modernization of the Committee on Foreign Investment in the U.S. and investigations under Section 301 of the Trade Act of 1974 into Chinese intellectual property theft, to better combat Chinese industrial policies targeting American intellectual property.

Updates to the Conventional Arms Transfer policy and unmanned aerial systems export policy to increase U.S. industrial base competitiveness and strengthen international alliances.

Reorganization of the former Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, the work of the "Section 809 panel," and development of the adaptive acquisition framework all aim to streamline and improve defense acquisition processes.

Restructuring the Defense Acquisition University to create workforce education and training resources that will foster increased agility in acquisition personnel.

Response to Section 1071(a) of the National Defense Authorization Act for FY2018 which requires establishing a process for enhancing the ability to analyze, assess, and monitor vulnerabilities of the industrial base.

Creation of a National Advanced Manufacturing Strategy by the White House Office of Science and Technology Policy, focused on opportunities in advanced manufacturing.

Department of Labor's chairing of a Task Force on Apprenticeship Expansion to identify strategies and proposals to promote apprenticeships, particularly in industries where they are insufficient.

DoD's program for Microelectronics Innovation for National Security and Economic Competitiveness to increase domestic capabilities and enhance technology adoption.

DoD's cross-functional team for maintaining technology advantage.

Implementation of a risk-based methodology for oversight of contractors in the National Industrial Security Program, founded on risk management framework principles to assess and counter threats to critical technologies and priority assets.

### FUTURE EFFORTS BY THE SECRETARY OF DEFENSE INCLUDE:

Create an industrial policy in support of national security efforts, as outlined in the National Defense Strategy, to inform current and future acquisition practices.

Expand direct investment in the lower tier of the industrial base through DoD's Defense Production Act Title III, Manufacturing Technology, and Industrial Base Analysis and Sustainment programs to address critical bottlenecks, support fragile suppliers, and mitigate single points-of-failure.

Diversify away from complete dependency on sources of supply in politically unstable countries who may cut off U.S. access; diversification strategies may include reengineering, expanded use of the National Defense Stockpile program, or qualification of new suppliers.

Work with allies and partners on joint industrial base challenges through the National Technology Industrial Base and similar structures.

Modernize the organic industrial base to ensure its readiness to sustain fleets and meet contingency surge requirements.

Accelerate workforce development efforts to grow domestic STEM and critical trade skills.

Reduce the personnel security clearance backlog through more efficient processes.

Further enhance efforts exploring next generation technology for future threats.

Future efforts by the Secretary of Energy include:

Submit legislative proposal for FY2020 to establish an Industrial Base Analysis and Sustainment program to address manufacturing and industrial base risk within the energy and nuclear sectors.

Future efforts by the Secretary of Labor include:

Work with the Departments of Defense, Education, and Commerce to determine critical manufacturing and defense industrial base occupations and their corresponding definitions in the 2018 Standard Occupational Classification System. Using historical data from the Bureau of Labor Statistics and demand data gathered from industry, determine specific occupations to target for current and future pipeline growth (e.g. systems engineers, computer numerically controlled tool operators, welders) and:

Assess potential incentives to recruit and retain workers to enter and/or stay in the industrial base, such as tuition reimbursement.

Create or foster comprehensive training and education programs in coordination with federal, state, academic, and local sponsors.

Work with states to reduce occupational licensing barriers preventing qualified workers from quickly and efficiently meeting needs in other regions, thereby aiding geographic movement of individuals possessing critical skills to areas in need of human capital for production and maintenance (e.g. shipyards, depots, and production plants).

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