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Industry Study
Final Report
Weapons Industry



The Dwight D. Eisenhower School for National Security and Resource Strategy

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WEAPONS 2014

ABSTRACT: During the 2013-2014 Academic Year, the Dwight E. Eisenhower School for National Security and Resource Strategy Weapons Industry Seminar examined a representative cross-section of the U.S. Defense Industrial Base (DIB). This cross-section included companies and government-owned facilities representing the major sectors of the DIB: small arms, medium and large caliber weapons, bombs and missiles, energetics, ammunition, sensors, nuclear weapons, and non-lethal weapons. Unlike previous analyses performed, the seminar did not focus on sector-specific issues. Instead, the seminar undertook a series of cross-cutting analyses on issues that affect all sectors within the DIB. Some of these issues include fiscal uncertainty, International Traffic in Arms Regulations, vulnerabilities in supply chains, and innovation. The results of this analysis reveal more strength and resiliency in top-tier defense manufacturers than anticipated, while second and third tier companies may require further consolidation to reduce excess capacity during constrained budgetary cycles. Additionally, cumbersome regulations and antiquated acquisition processes negatively impact U.S. firm competitiveness in both the domestic and international markets and must be reformed.

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PLACES VISITED

- Las Vegas, NV
 - Shooting, Hunting, and Outdoor Trade Show (SHOT Show) 2014
 - Air Force Weapons Center, Nellis AFB
- Radford Army Ammunition Plant, BAE – Managing Contractor, Radford, VA
- Allegheny Ballistics Laboratory, ATK – Managing Contractor, Rocket Center, WV
- Colt Defense LLC, Hartford, CT
- Smith & Wesson, Springfield, MA
- Camden, AR
 - Raytheon Missile Systems
 - National Testing Services
 - Spectra Technologies LLC
 - Aerojet General Corporation
 - Lockheed Martin Missile Systems
- PanTex Nuclear Weapons Maintenance Center, Babcock & Wilcox – Managing Contractor, Amarillo, TX
- Kirtland Air Force Base, Albuquerque, NM
 - Sandia National Laboratory
 - Defense Nuclear Weapons School
 - Kirtland Underground Munitions Maintenance Storage Complex
 - Nuclear Weapons Instructional Museum
- Tuscon / Scottsdale / Mesa, AZ
 - Raytheon Missile Systems
 - Aerospace Maintenance and Regeneration Center, Davis-Monthan AFB
 - Nammo – Talley Defense Group
 - Taser International
 - ATK Medium Caliber Systems
- Naval Surface Warfare Center, Dahlgren, VA
 - Railgun Center
 - Directed Energy Weapons Center



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MILITARY SPENDING

Military Budgets over Time

Since the end of World War II, defense spending has been cyclic, following national strategy and military conflicts as shown in Figure 1.¹ The general trend has been an increase in spending prior to, and during a major conflict, followed by a decrease in spending after the conflict has concluded. As the conflicts in Iraq and Afghanistan come to an end, it is not surprising that defense spending is once again the focus of congressional attention as a means to reduce overall federal spending.

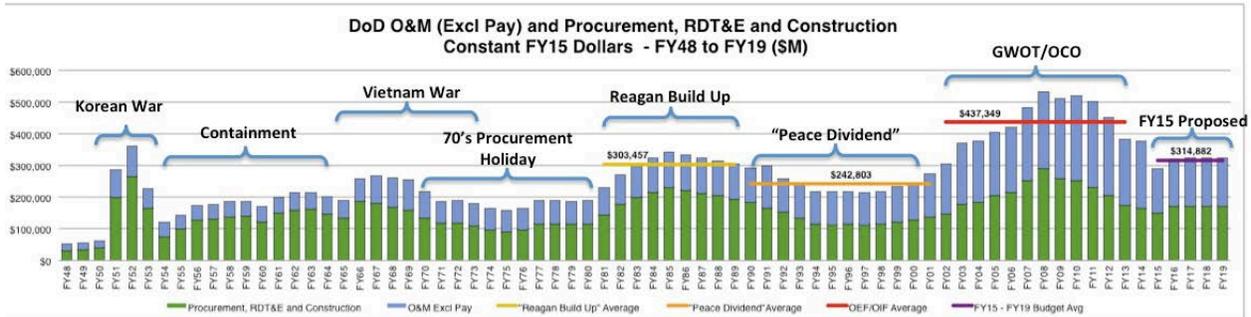


Figure 1- U.S. Defense Spending - Non-Pay O&M Plus Procurement / RDT&E / Construction¹

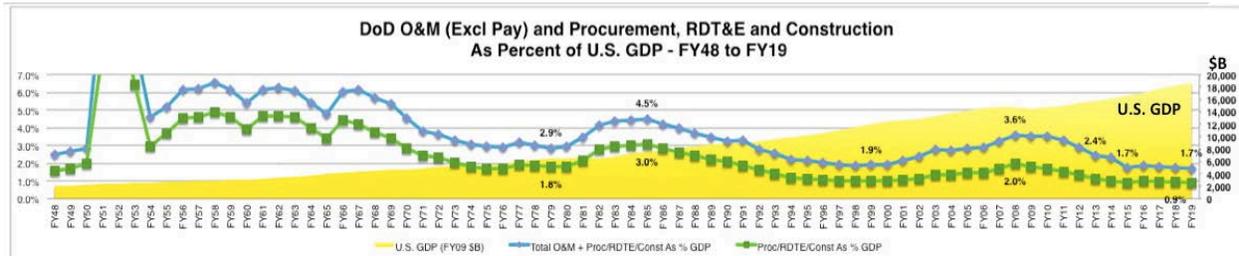


Figure 2 - the DoD O&M (Excl Pay) and Procurement/RDT&E/Construction Spending As Percent of U.S. GDP - FY48 to FY19

Fiscal Year 2015 Proposed Budget

In March, 2014, Department of Defense (the DoD) released its 5-year proposed FY15-FY19 budget. This budget proposal is in line with spending caps imposed under sequestration (and subsequently modified by the *Murray-Ryan Bipartisan Budget Act*); however, the request includes an additional \$26 billion “Opportunity, Growth and Security Initiative” intended to support readiness of forces which will exceed spending caps². Additionally, the proposed budget constitutes only 1.7% of the gross domestic product (GDP), a historically low percentage. Despite this low percentage, when looked at in constant dollars, this amount is greater than spending during much of the “Reagan Era” military buildup.

Analysis

Budgeting for national defense is a difficult balancing act that seeks to ensure our military forces are trained and equipped to significantly overmatch potential adversaries while at the same time dealing with the realities of fiscal concerns and constraints. While it is correct to state that the Fiscal Year (FY) 2015 budget proposal represents the lowest level of investment in defense in history in terms of overall GDP, such a statement is myopic and ignores the growth in overall



GDP. As the nation's economy has grown, the general trend of peacetime spending has from roughly 6% during the 1950's and 60's to an average of 2% in the 1990's and beyond. It should be noted that spending on defense as a percentage of GDP this is in line with the North Atlantic Treaty Organization (NATO) desired spending levels of 2% of national GDP.

The proposed DoD spending across they FYDP averages \$314 billion per year - \$11 billion more per year than the average spending during the "Reagan Build Up" during the 1980's, and \$72 billion higher annual spending of the "Peace Dividend" era in the 1990's. The proposed budget continues the trend investing in highly capable, but expensive, weapon systems to gain capability while reducing reliance on large numbers of personnel.

The overall budgetary trends reflected within Figures 1 and 2 also contain other implications for the defense industry. As mentioned above, spending on defense as a percentage of GDP reflects a generally downward trend, meaning the defense industrial base (DIB) commands an ever-dwindling portion of the overall GDP, while commercial and other government sectors grow. As non-defense, commercial industries gain in importance while defense related industries tend to decline, this diminishing stature and influence can have negative impacts on the companies themselves, beyond the impact to their bottom line. For example, several members of the DIB have expressed concern over their ability to continue to attract talented human capital when opportunities in other, non-defense commercial operations may appear more lucrative.

Returning to analysis of Figure 1 and focusing on the difference between proposed FYDP funding levels relative to those of the Global War on Terror (GWOT) years of FY02 thru FY13, in general terms it does not appear industry should prepare for another round of "Last Supper" consolidations – at least not at the top tier. Given the proposed investment in next generation fighter aircraft, cyber capabilities, etc., top tier companies should be able to continue to operate competitively as they are currently organized. However, consolidation of lower tier firms that operate on volume of sales, such as those producing ammunition, may require consolidation in order to remain competitive.

Lastly, uncertainty in future budgets remains a major concern in the DIB. Even with the recent spending cuts enacted as a result of sequestration, the Congressional Budget Office predicts the U.S. federal deficit will exceed \$1 trillion by 2022 as a result of continued entitlement spending, an aging population, and interest payments on the national debt.³ Concern over high levels of national debt sparked the last round of belt tightening, and may have a similar impact once debt starts to rise in the out years.

Conclusion

Crafting a federal budget which provides adequate resources to support the defense of the nation while balancing competing demands for domestic entitlement spending and in light of massive federal debt is a daunting task. The proposed FY15 budget reduces defense spending on non-pay O&M, procurement, RDT&E and construction to historic lows as a percentage of GDP. However, spending in terms of constant year dollars remains above spending during the Reagan-era "Defense Build Up." While the large defense budgets of the Global War on Terror are behind us, the proposed FY15-FY19 budget represents reasonable peacetime funding. Reduced funding levels present challenges for the defense industrial base to "right size" for peacetime operations, while remaining competitive and healthy.



TRENDS IN AMMUNITION

Over the past five years there has been a significant increase in demand for small arms ammunition, consequently resulting in a shortage of small arms ammunition. While there were a multitude of factors that influenced the availability of ammunition, one of the greatest contributors was ammunition hoarding caused fear, primarily the “fear” that the “Government” was buying up and restricting flow of ammunition to retail stores throughout the United States. Further complicating the problem was the increase in the price of ammunition when it was available. The ammunition industry benefitted from the higher prices but has remained pressured to meet demand for the last five years. This trend is waning. Conspiracies have shown not to be true, the war in Iraq is over, the war in Afghanistan is in its last full year and the Nation is still dealing with constrained financial resources. These factors will influence ammunition availability over the next five years; it will cost less and be more readily available.

Demand

“Despite the economic fallout generated by the financial crisis, guns and ammunition have proven to be items that many believe they cannot live without. The industry experienced aggressive revenue growth during the recession, as consumers’ recessionary fears about rising crime and more restrictive gun control laws overrode their financial restrictions.”⁴ Fear proved to be a powerful incentive when it came to gun and ammunition purchases. Many of these fears were driven by concerns the Obama Administration would enact new, more restrictive legislation on guns and ammunition in reaction to national gun-related tragedies. This potential restriction on the 2nd Amendment rights help fuel a 66% increase in profits for the gun industry, all of that since the financial crisis and great recession of 2008.⁵

“The number of FBI Nation Instant Criminal Background Checks (NICS) has risen every year since 2002 and is currently on track to reach an all-time high...”⁶ In the four years prior to 2012, the number of NICS rose 11.4% and in the first three months of 2013 that number increased to 44.5% as compared to the same time the previous year.⁷

The United States Military, Federal, State and Local law enforcement placed a greater demand on the ammunition supply as well. The primary demand pressure on the ammunition industry came from the steep increase in overseas commitments of all branches of the military services and heightened requirements for federal, state and local law enforcement in response to the post-9/11 National Security environment. Increases in military and law enforcement staffing and training added to an already pressured civilian market. This combined demand produced an increase in revenue for gun and ammunition manufacturers at a rate of 8.4% to \$14.7 billion in the five years up to 2013, with a forecast increase of 20.2% in 2013.⁸

Industry Trends

According to IBIS World U.S., the U.S. guns and ammunition market for 2013 was \$14.7 billion, had an annual growth rate from 2008-2013 of 8.4% and had a total profit of \$1.5 billion. The projected annual growth rate for this combined industry from 2013-2018 is 4.5%.⁹ With demand for industry products surging during the past five years, domestic manufacturers have struggled to keep up.”¹⁰ This has led to imports gaining traction within the gun and ammunition market at an annual rate of 9.3% to \$3.9 billion over the five years leading up to 2013.¹¹

The near-term trend is for government spending to remain unchanged with Local and State Government Investment returning to small growth in the next five years.¹² The 2018 forecast for



investments is \$317.5 billion and a modest increase in growth of 1%.¹³ Crime rates are generally directly proportional to law enforcement funding increases as well. Despite initial fears, crime rate decreased throughout the Great Recession, continuing the trend of steadily falling crime rates for the last 20 years.¹⁴ The crime rate is forecast to drop to 3,053 crimes per 100,000 in 2018 which represents a decrease 1.3%, a full percent lower than 2013.¹⁵

The trends, downward for defense and crime, neutral for local and state government investment and increased availability of raw commodities show an overall positive to positive neutral trend for the ammunition industry. Due to the fall in the DoD requirements, industry will be forced to find other positive revenue streams, primarily from increasing exports to U.S. allies and future markets globally. Smaller businesses that do not possess the ability to export to compensate for lost domestic revenue will be forced to innovate or integrate.

ATK and Nammo-Talley

At the industry level, trends in ammunition production are evident in both the major producers like Alliant Techsystems Inc. (ATK) and at the minor, more specialized level, like Nammo-Talley. Alliant Techsystems is a diversified company with both commercial and military divisions. It is the largest domestic producer of military small-caliber ammunition for use in soldier-carried weapons, and one of the largest producers of medium-caliber ammunition used by crew-served weapons on armored vehicles and aircraft.¹⁶ Additionally, ATK is currently the managing contractor of the Lake City Army Ammunition Plant (LCAAP).¹⁷ In fiscal year 2012, ATK produced over 1.5 Billion rounds at LCAAP.¹⁸

Nammo-Talley, the U.S. subsidiary of The Nammo Group, is on the lower end of small-caliber ammunition production. Nammo-Talley describes itself as having “a strong footprint in the U.S., is a pioneer in developing aircrew systems, shoulder-fired weapons, rocket motors, gas generators, warheads, innovative explosive devices, specialty propellants and composite structures.”¹⁹ Nammo-Talley makes 72% of its annual revenue in the international market, the United States and Canada account for 31%, with 19% of that 31% coming specifically from U.S. sales.²⁰ A very small portion of their annual revenue comes from the U.S. defense and law enforcement markets for their small-arms manufacturing. Nammo-Talley is not a high volume producer and chooses to compete in this market based on differentiation, not price. In a future of fiscally constrained defense budgets where the cost of every round will be critical it is questionable whether a company that produces costly high-quality, highly-accurate rounds at a much lower volume can remain solvent.

Conclusion

The trends in ammunition are evident. The U.S. economy is recovering, crime rates remain at historic lows, fears of ammunition hoarding are subsiding, and the conflicts in Iraq and Afghanistan are concluding; demand for ammunition is decreasing. The National Rifle Association stated in its January edition of *American Rifleman*, that gun owners “only have themselves to blame” for the tight civilian ammunition supply.²¹ Civilian demand for ammunition will decrease, supply will go up and prices will fall. As for the military, only future funding for defense will tell. In times of austerity the military typically cuts Operations and Maintenance (O&M) funds which generally equates to less rounds being available for training. Lack of consistent training eventually leads to tiered readiness, meaning only those units scheduled for deployment will fire live rounds for qualification and proficiency. The future trend is for ammunition manufacturers to diversify, innovate and rely less on the DoD contracts for solvency.



Those businesses that do not or cannot will face the unenviable choice of integration or extinction.

INDUSTRIAL BASE SUSTAINABILITY AND CONSIDERATIONS FOR REDUCED PRODUCTION CAPACITY

Historical trends demonstrate that reductions in defense spending and force structure coincide with post war stabilization; however, a particular period of austerity saw drastic consolidation of the defense industrial base. Between 1985 and 1994, the DoD funding for the procurement of ammunition declined by 80 percent.²² Faced with no impending demand signal or coherent industrial base policy, the service's acquisition managers tapered contracts and terminated munitions programs. The result of such drastic government actions led to the departure of more than 70 percent of the munitions manufacturing firms from the defense market--never to return.²³ What seemed like logical decisions at the individual program manager level resulted in an overall crisis in the industrial base and threatened our nation's ability to respond to national security threats.

Many product lines support defense unique capabilities for which there is no commercial market demand. Additionally, munitions manufacturing generally falls into one of two categories; those designed to produce hundreds of thousands of rounds per year or low volume yet highly skilled and labor intensive assemblies of state-of-the-art precision weapons.²⁴ With current demands amounting to little more than a month's production capacity, many firms will soon be faced with the decision to operate at an economic loss or exit the market; both of which increase the vulnerability of the defense industrial base in responding to emerging national security threats. *The unintended consequence of such actions on defense unique yet fragile markets requires DoD action to preserve critical defense industrial base capacity.*

The DoD Instruction 5000.60, *Assessing Defense Industrial Capabilities*, provides a handbook to evaluate the need and assess the best alternatives for government action to preserve industrial capabilities that are critical to national security. The overarching guidance stipulates that the defense department relies on market forces to the maximum extent possible to guide the development and sustainment of industrial capabilities and will only take action in those exceptional cases where a defense unique industrial capability is genuinely at risk of being lost.²⁵ The handbook offers seven alternatives for action: 1) take no action, 2) procure from foreign sources, 3) identify substitutes, 4) procure a lifetime buy, 5) identify other technical solutions, 6) conduct a smart shutdown, and 7) maintain current capability but at reduced production rates.

Smart Shutdown

Assuming there is no current or near term demand forecast and that war reserves are satisfied, a smart shutdown is a viable option. A smart shutdown entails purposely preserving certain elements essential to reproducing a product or service, while allowing the current development or production activity to stop.²⁶ The intent of a smart shutdown is to preserve intellectual capital and the necessary tooling to enable a restart of production in the future. Of note, it is not necessary to preserve the actual facilities or common equipment. The primary consideration for this option is determining if restarting an existing product line is a better alternative in terms of delivering a required capability within a given timeframe than a new start acquisition program. Despite the potential cost and schedule savings of a smart shutdown, it is not a "cure all."



Sustaining Lower Rates of Production

An initiative of Better Buying Power 2.0 is to design for maximum economic production rates during full rate production. This rate is defined as the output rate at which the end product can be manufactured at the least total cost and "...occurs just before the existing or planned plant capacity, tooling or test equipment are exceeded; i.e., further increases in quantity incur an increase in unit cost due to the inability to amortize further facilitation and rate tooling costs."²⁷

As demand tapers, or fiscal uncertainties emerge, government program managers should leverage the flatness of the production rate curve prior to considering more drastic options, as empirical studies of established high volume production lines substantiate that a 30% reduction in quantity from the max production efficiency rate results in only a 6% increase in per unit costs.²⁸ When funding or demand is further reduced, program managers must look to minimum sustainment rates in order to preserve critical labor force skills while maintaining the ability to return to full production in a timely manner. Such an option should be considered when the expected gap in demand for a product is less than two years--otherwise, a smart shutdown is a better alternative.²⁹

Minimum Sustainment Rate

The DoD definition for Minimum Sustainment Rate (MSR) is "The lowest number of units a contractor can economically produce within a correlating specified period of time."³⁰ Unfortunately, current the DoD guidance relies on the contractor to provide the actual MSR for a particular production line leaving government program managers ill equipped to validate a contractor's estimate and further confused when a firm declares an MSR quantity yet later bids on a contract to produce quantities at less than MSR. The question remains "Can the government independently estimate a contractor's MSR?" While no mathematical models currently exist to derive a firm's MSR, the government must attempt to determine the point where total revenue falls below a firm's variable cost.

Conclusion

The reduction in munitions demand associated with the return of U.S. forces from protracted wars in Iraq and Afghanistan, coupled with downward pressure on defense budgets, forces the DoD to once again balance near term readiness with enduring industrial base capacity. Historically, the DoD has turned to large caliber munitions to mitigate the impacts of budget cuts from highly visible platforms such as aircraft, tanks and ships. Unfortunately, many of these product lines support defense unique capabilities for which there is no commercial market demand; leaving many firms susceptible to economic losses and further increasing the vulnerability of the defense industrial base in responding to emerging national security threats. As such, government program managers, budget programmers and congressional committees must re-examine industrial base policy options to mitigate the unintended consequences experienced in the early 1990's. In particular, gaps in demand of less than two years should consider minimum sustainment rate contracts; however it is imperative that government decision makers independently validate the contractor's MSR quantity in order to insure best value for the DoD. When the demand gap is greater than two years and the product line previously achieved full rate production, a smart shutdown is more cost effective and offers a more timely return to production than a new start program.



EXPORT CONTROL – IMPACTS ON THE DEFENSE INDUSTRIAL BASE

The unquestionable dominance of the U.S. military on the battlefield is the result of a robust and healthy U.S. domestic defense industrial base. Therefore the continued success and the future assurance of U.S. military superiority depend upon the continued success and vitality of these supporting industries.

Throughout the semester in discussions with industry the issue of export regulations has been a topic of concern. While industry understands and appreciates the necessity for such control on the exportation of technically sensitive goods and services, there is an overwhelming belief the regulations and processes have become overly restrictive and have lost sight of the original intent – that is preserving the advanced technologies that give the U.S. military the advantage on the battlefield. Americans value and embrace the ideals of capitalism and fair competition, the Arms Export Control Act of 1976 provisions (AECA) and the Export Administration Act of 1979 (EAA) and their enforcement regulations - the International Trade in Arms Regulations (ITAR) and Export Administration Regulations (EAR) - severely restrict the sale of U.S. produced goods and services overseas. These regulations place U.S. companies at an unfair disadvantage when trying to compete globally.

History of Export Restrictions and Regulations

The history of trade restrictions is as old as this country, In December 1774, the First Continental Congress declared the importation of British goods to be illegal. In 1775, Congress outlawed the export of goods to Great Britain.³¹ The genesis of modern day restrictions, such as ITAR and EAR, can be traced back to the First World War, when the *Trading with the Enemy Act of 1917 (TWEA)* permitted President Woodrow Wilson to prevent or prohibit “foreign exchange” with the enemies of the U.S. This Act was originally designed to prevent U.S. involvement in the World War I by limiting U.S. financial interactions with Europe.³² This initial legislation paved the way for tighter regulations and restrictions as the U.S. prepared for the World War II. The *Neutrality Act of 1935* “prohibited the export of “arms, ammunition, and implements of war” from the United States to foreign nations at war and requiring arms manufactures in the United States to apply for an export license.”³³ After the conclusion of World War II, the Export Control Act of 1949 (ECA) was enacted, primarily to “restrict the export of strategic materials and equipment to Soviet bloc nations”.³⁴

The ECA remained in effect throughout the Cold War, as the perceived threat of the Soviet Union persisted. In addition to the U.S. ECA restrictions, North Atlantic Treaty Organization (NATO) allies established the Coordinating Committee for Multilateral Export Controls (CoCom). The CoCom generally reiterated the U.S. ECA restrictions within NATO, restricting the transfer of material or technology to the Warsaw Pact. With the collapse of the Soviet Union, the dissolution of the Warsaw Pact and the ending of the Cold War, President George H.W. Bush greatly streamlined the export control system.³⁵

The CoCom was revoked in 1994 and replaced by the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-use Goods and Technologies in 1997. The Wassenaar Arrangement (WA) is considered much less stringent than CoCom, with 41 countries participating (including many former Warsaw Pact countries as well as the Russian Federation).³⁶ WA promotes the transparency and greater responsibility in transfers of conventional arms; however as an international treaty with 41 signatories, there is no veto or enforcement power, nor is it legally binding.³⁷



Arms Export Control Act of 1976 / Export Administration Act of 1979

The Arms Export Control Act of 1976 (AECA) and the Export Administration Act of 1979 (EAA) are the two pieces of legislation responsible for the establishment of the strict export control mechanisms and enforcement tools, commonly referred to as ITAR and EAR. The AECA established ITAR and the EAA established EAR. The ITAR and EAR are two separate export control mechanisms, presided over by separate agencies, the U.S. State Department and the Department of Commerce.

The State Department maintains the U.S. Munitions List (USML), detailing “significant military equipment” subject to export control. The USML, Part 121 is divided into 21 categories ranging from firearms, explosives and energetics, to nuclear weapons.³⁸ Any Article, service or related data found to be on the USML requires an export license issued by the U.S. State Department to be exported, sold, or given to a non-U.S. person (including U.S. persons who work for a foreign company, government, or non-governmental organization).

Impacts on the Defense Industrial Base and Small Business

The single largest burden related by one defense contractor was related to the screening process for potential suppliers and customers in terms of safeguarding and the preventing the transfer of technical data³⁹. In addition to registration fees, there are costs associated with maintaining export regulation compliance; such as: General and Administrative (G&A) labor costs for the additional layer of management, accounting, and compliance assurance personnel to ensure export regulations are being adhered to.

The second significant burden voiced by industry concerning the current export control system is the ever-changing rules of the process. The ITAR and EAR are complex, ambiguous federal regulations, and unfortunately offer little guidance or even notification when the rules change. Export control compliance is a complex endeavor. There are approximately 20 elements to a compliance program, each of which has strict procedures and rules.

The last burden shared from industry was the time associated to ensure ITAR and EAR compliance and the missed opportunities, especially opportunities to sell goods and/or services in the global marketplace due to the bureaucratic processes required. As described by one defense contractor, “time is a precious commodity”, requests for bids or proposals are normally open for 30-45 days. U.S. defense contractors wishing to compete globally have a very small window of opportunity to screen the potential company for ITAR compliance, obtain a license, and submit the proposal.

Export Control Reform (ECR)

The Obama Administration recognized the current export control system is dysfunctional and in need of reform. In August 2009, a broad interagency review of the U.S. export control system determined “export control system is overly complicated, contains too many redundancies, and in trying to protect too much, diminishes our ability to focus our efforts on the most critical national security priorities.”⁴⁰

The ECR is currently being implemented in three phases. Phase I and II reconcile the multiple and often-contrary definitions, regulations, and policies for export controls. Phase III is the consolidation of the USML and CCL into a single control list; reviewing “sensitive” technologies, the establishment of a single licensing agency, a common and unified information technology system, and an enforcement coordination center.



Conclusion

The continued preeminence of the U.S. on the world stage, especially the dominance of the U.S. military on the battlefield, is dependent on a robust and healthy defense industrial base. As U.S. businesses struggle to cope with the uncertainties of budget cuts as imposed by sequestration, the reduced demand for the products, goods and services provided by U.S. companies threaten to severely diminish or even kill the industrial capacity of the nation. Combined with export control regulations that further restrict U.S. businesses from competing in a global marketplace, there is a very real concern that if restrictions are not lifted, the defense industrial base will not be able to support the U.S. war fighter in the manner in which we are accustomed. Export control reform is a must and the tyranny of bureaucratic institutions lacking any common sense must be abolished.

IMPACTS OF SUPPLY CHAIN VULNERABILITIES ON THE WEAPONS INDUSTRY

In these days of budget constraints and fiscal austerity, the weapons industry seems to be a popular target for defense cuts and savings garnered from outsourcing to the global market. The United States military is hands down the best in the world, but failing to invest in the weapons industrial base, specifically the infrastructure of critical sole source production facilities, and outsourcing critical defense components to foreign countries are mistakes that will cause voids and supply chain vulnerabilities that challenge our military dominance in the future.

Sporadic demand for ammunition over time has directly affected the prioritization and focus of effort for up keep and modernization of critical U.S. ammunition production facilities. Historic trends show that defense spending is cyclic; as a conflict ends, funds spent on defense decline. One of the first budget line items that is cut is ammunition production. Putting critical, single-source ammunition production facilities in “moth balls” is not the right answer; the DoD must continue to invest in the infrastructure and skills necessary to keep these facilities reliable and fully functional.

Aging Facilities

The Radford Army Ammunition Plant (RFAAP) is an example of a facility that is vital to not only the U.S. ammunition production, but also the entire weapons industry. Constructed during the early days of World War II to support military ammunition production for both the U.S. and its allies, RFAAP is U.S.’s sole source producer of nitrocellulose. This compound is the essential ingredient for all propellants and explosives used throughout the U.S. military’s ammunition industrial base.⁴¹ The greatest vulnerability to the plant is the infrastructure of the facilities. As an example, nearly all of the current water and sewer lines are vintage clay, ceramic, or tile; original to the 1940s construction. Should one of the facilities or pieces of critical equipment that make up RFAAP fail, the production of ammunition required by all of the DoD would cease.

Operating under fiscal austerity and tight budget constraints, such as sequestration not only impact the ability to maintain and modernize the weapons industrial base, but also drive procurements to be made overseas, where goods can be acquired much cheaper than they can be made in the United States. This highlights yet another vulnerability to the weapons industry.

Weapon System Vulnerabilities

The Hellfire missile is a subsonic missile with significant capability. The component that



produces the energy and thrust to propel the Hellfire to its target is the Thiokol TX-657 solid rocket motor (SRM). These two tiers of the supply chain, the missile and the SRM are manufactured by Lockheed Martin and ATK Launch Systems respectively; both reputable U.S. corporations. However, as we dig further in the supply chain potential vulnerabilities arise.

The Thiokol TX-657 SRM relies on solid rocket fuel, Butanetriol trinitrate (BTTN), BTTN, in turn, requires the chemical Butanetriol (BT), which is currently manufactured by a single source; a single source Chinese manufacturing firm. Currently there are no viable alternatives to BTTN.

As with the Hellfire missile, Night Vision Device technology is reliant on several sub-components. One of those is a rare earth element (REE) known as Lanthanum. The U.S. currently imports 98% of Lanthanum from other countries; 91% is from China.⁴² The example of REEs can also be expanded to include high quality silicon for integrated circuits – critical to all advanced weaponry; titanium – critical to all modern military aircraft and submarines; and to countless other advanced systems and sub-systems that help give the U.S. military its technologic and asymmetric advantage in the battle field and on the sea.

Reliance on Foreign Rare Earth Elements

The Chinese monopoly over commodities such as BT and Lanthanum create an extreme vulnerability in the weapons industry. China has already demonstrated its willingness to restrict access to resources to obtain political and economic concessions; in 2010 they ceased exports of REEs to Japan over a maritime dispute and Japan's detention of a Chinese fishing trawler captain.⁴³ The U.S. cannot allow China that kind of leverage over our critical weapons systems.

Recommendations

Having identified the problems; the only producer of nitrocellulose in North America operates out of a dilapidated GOCO ammunition production facility at RFAAP and the only source of supply for BT and Lanthanum is our potential future adversary, China. The question that must be answered is what actions must the U.S. take to mitigate or eliminate potential threats to the supply chain that threaten to erode the weapons manufacturing industrial base?

First, the U.S. government must get redouble its efforts in upgrading and preserving critical industry infrastructure. The need for additional resources to support modernization of facilities and manufacturing equipment cannot be overemphasized.

The government must also engage to ensure domestic development of key components and natural resources required for both advanced and ubiquitous weapons systems. The United States must stop relying on other countries, like China, to provide critical commodities in support of weapons manufacturing.

Finally, the U.S. must figure out how to maintain oversight of third and fourth tier components that are necessary for critical weapons systems. This country cannot afford to rely on foreign imports as sole sources of supply.

Conclusion

Dwight D. Eisenhower once said "I have one yardstick by which I test every major problem - and that yardstick is: Is it good for America."⁴⁴ Neither allowing U.S. ammunition production facilities to decline, nor relying on foreign imports to support the U.S. weapons industrial base in these times of budgetary constraints and fiscal austerity are good for America. We cannot afford to lose the edge; the United States success in war has been largely due to the ability to surge in ammunition production facilities and maintaining technological superiority over all others in the



world. The ability to surge the weapons industry and technological superiority have been a given up until now, redouble its investment efforts in the industrial base those strengths will quickly turn to vulnerabilities; vulnerabilities that may cost U.S. the next war.

THE “IRON TRIANGLE”

The "iron triangle" is “a closed, mutually supportive relationship that often prevails in the United States between the government agencies, the special interest lobbying organizations, and the legislative committees or subcommittees with jurisdiction over a particular functional area of government policy.”⁴⁵ This concept was famously first applied to the U.S. defense industry by President Dwight D. Eisenhower in his 1961 Farewell Speech:

In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist. We must never let the weight of this combination endanger our liberties or democratic processes. We should take nothing for granted.⁴⁶

While this term can be applied to many other sectors, the defense industry's triangle stands out from the others primarily due to the size of the annual defense budget, the costs of major weapons systems, and the impact the industry has on national security and the national psyche. In theory, this three-sided arrangement should be a balance of competing interests and duties, with sufficient involvement, expertise, and motivation on each side to allow them to act as watchdogs on the others. The reality is that this system has devolved into an entrenched scheme in which, all too often, each side supports the other two in pursuit of unnecessary or overly-expensive weapons systems that place an egregious burden on the country's overstretched budget.

The U.S. Military

Any review of the problem must start with a look at the U.S. Military and its procurement process. The Military is in the best position to know what equipment it needs to counter the wide range of threats present around the world. Once the Military decides what its requirements are, work begins with Industry to develop systems responsive to those requirements. The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD ATL) oversees a sizable force of uniformed members, civilian employees and contract personnel charged with acquiring the right equipment and supplies, at an affordable price, in a competitive environment, by using established procedures and practices to ensure the system functions as efficiently as possible. However, analysis has shown significant issues with the military's involvement in the triangle. These problems include, but are not limited to:

- An acquisition system that rewards personnel – at any level – for managing a program that produces a system that is no longer needed, is too expensive, or fails to meet the needs of the service.⁴⁷
- Senior officers rotating immediately from active duty to employment at major defense contractors.



The Defense Industry

The patriotic corporate leaders of the 1940's who temporarily converted their factories from civilian to military production, in exchange for some acceptable level of profit, to be sure, have been replaced by politically-savvy business executives who depend in large part on defense contracts for the health of their companies. While no one should question their love of country, analysis indicates a continual pattern of cost overruns, missed deadlines, and missed performance targets that clouds the patriotic vision of their companies. Further analysis indicates the following potential issues:

- Contracts – Due to the contracts most major systems are let under (cost-plus), the costs associated with delays or contractor errors are borne by the government.
- Lobbying - Lobbying, at its simplest, is trying to get what you want by talking to the people who make decisions.⁴⁸ In reality, it is made much more complex by the vast commercial enterprise that has engulfed Washington, DC and virtually every state capital in the country. The defense industry has spent over \$130 million every year since 2008.⁴⁹ Many of these lobbyists are retired flag or general officers.
- Campaign Finance - Closely related to the ethical questions raised by the proliferation of lobbying efforts in Washington is the increasingly murky world of campaign finance. According to the Center for Responsive Politics, in the 2008 election cycle, defense firms gave \$21.7 million to Congressional candidates, with \$11.5 million going to Democratic candidates and \$10.2 million going to Republicans, and an overwhelming \$19.7 million going to incumbents.⁵⁰

There is a marked difference between a firm appropriately trying to sell its products by advertising the benefits to interested consumers and the current model of buying – or renting – influence with the decision-makers who can fund or kill a multi-billion dollar program. Because of the sums of money involved, and the influence wielded by the players in this game, this is seemingly intractable problem will not be solved easily. It will require daring leaders with the resolve to fight against the entrenched corporations, lobbyists, and even officials, elected or not, who are benefitting from the current system.

The U.S. Congress

The Congress makes up the part of the iron triangle about which the most has been written, but which is almost certainly the toughest to fix. Because the defense industry has been so generous, as described above, Congress has been willing to push forward pet projects despite the objections of the Department of Defense. Recent examples include the \$436 million added to the 2013 budget to continue production of the Abrams tank at the only plant that produces it, located in politically-important Lima, Ohio and affecting 700 jobs. The Abrams program also involves 560 sub-contractors spread around the country.⁵¹ In 2009, Congress added \$670 million to the 2010 budget to buy three more C-17 cargo planes the Air Force didn't want and didn't ask for, saying they had sufficient airlift. Boeing, the prime contractor on the C-17, had given over \$160,000 to the campaigns of members of the House Defense Appropriations Subcommittee over the previous 2 years. At the same time, Congressmen, led by Representative John Murtha of Pennsylvania, added \$400 million to finish five of the VH-71 Presidential helicopters, even though Defense Secretary Robert Gates, President Obama, and the Marines all said they didn't want the new helicopter. Key components of the VH-71 are made in, not surprisingly, Pennsylvania.⁵²



Recommendations

The following recommendations are provided to reduce the influence of any one side of the “iron triangle” and to attempt to bring back balance to the defense procurement system.

- **Defense Acquisition Reform** – The defense acquisition system must be reformed; removing incentives for keeping a flawed program alive. Instead the DoD should mandate high-level critical reviews of each program at the various development milestones to determine the program’s relevance, efficiency, and priority. The DoD should create a joint acquisitions structure, headed by the Assistant Secretary for Acquisition to provide a clear-eyed review of all programs. This process would also help eliminate duplication of systems between the services as well as reduce the parochial intra-service advocacy of unneeded programs that seems to exist today.
- **End Cost-Plus Contracts** - The government should end the use of cost-plus contracts to the greatest extent possible, then exert all necessary effort to hold contractors accountable for their delays and mistakes. The government must also provide a decent profit margin for contractors, consistent with the certainties that and be found in long-term government contracts. Further, it is recommended that major contracts be transitioned to a two-year appropriations cycle to smooth out some of the valleys associated with annual budgets.
- **Campaign Finance Reform** – This recommendation attempts to limit the political influence campaign contributions given by defense companies have over incumbent and up-and-coming politicians. Specially, limits to contributions must be applied.
- **Pass a Domestic Version of Foreign Corrupt Practices Act** – While the FCPA makes it illegal to give money (or anything of value) to a foreign government official for the purpose of obtaining business with that person’s government, including hiring the children or family members of a foreign official; enforcing such activity within the U.S., however, is nearly impossible. A parallel law governing domestic business would solve some issues, from ethical to criminal.
- **Post-government Service Employment Restrictions** - Stricter laws barring government officials from accepting employment, to include consultant or advisory roles, from a firm they dealt with while in their government positions would eliminate the perceived ethical challenges presented by the current revolving door between government and the defense industry, including their lobbying partners.

Conclusion

The American system of government will never be perfect and it is unreasonable to expect the system for procuring military equipment to be, either. More laws will not necessarily stop every official from taking a bribe or supporting an unnecessary program, but a new system of fuller, more open and more immediate disclosure of business dealings, with term limits and real campaign finance reform, combined with streamlined rules governing defense acquisitions, would go a long way to restoring the public’s confidence in the system, and saving the taxpayers huge sums of money. If properly implemented, these steps would also result in a more focused, efficient military, better designed and equipped to counter the myriad threats to the nation’s security.

GOVERNMENT OWNED – GOVERNMENT OPERATED AND GOVERNMENT OWNED – CONTRACTOR OPERATED FACILITIES AS A MEANS TO SAVE THE WEAPONS INDUSTRIAL BASE

The national security budget increased rapidly in the years after September 11, 2001 to



fund the overseas contingency operations (OCO) in Iraq and Afghanistan as well as the increased homeland security mission in the United States. However, what goes up must eventually come down. The current fiscal climate of budget caps and sequestration places downward pressure on the entire Federal budget.

Private industry has noticed this budget paradigm shift and consequently recognized that it must plan now for future survival. One weapons industry senior executive recently conveyed this concern regarding the DoD's declining need for industry weapons production: "the DoD is using what is in its pantry rather than buying from the grocery store, with the assumption that the grocery store will be there when it needs it."⁵³ His concern is valid and is echoed by industry. The DoD's greater reliance on its current weapons stockpiles rather than purchasing new weapons could negatively impact the future of the weapons industry. How much of a negative impact remains uncertain at this time.

How does the DoD and the NNSA ensure the weapons industry "grocery stores" will be there when they need them? Two codified options exist: 1) government-owned and government-operated (GOGO) facilities; and 2) government-owned, contractor-operated (GOCO) facilities. The first option converts contractor-owned, contractor-operated (COCO) facilities to GOGO facilities. Each of these options has its advantages and its disadvantages. Both of these options seeks to preserve the weapons industrial base while allowing free enterprise to take its course. The GOCO option, specifically, could help save private companies that would otherwise exit the market because of reduced government spending.

Government Ownership and Government Operation

The concept of GOGO is not new. The U.S. Congress first authorized the establishment of U.S. GOGO arsenals in 1794 so that President George Washington could provide domestically produced arms to the new formed United States Army.⁵⁴ The U.S. Army relied primarily on GOGO arsenals to provide military arms and ammunition until World War I. This reliance on U.S. GOGO arsenals to provide the backbone of U.S. military arms and ammunition production led Congress to pass, what is commonly known as, the *Army Arsenal Act*, codified in Section 4532 of Title 10, United States Code (USC), which made permanent the authority for GOGO arsenals.⁵⁵ Today, the Army owns and operates over a dozen arsenals and ammunition facilities.

GOGO facilities are not a means of growing the government footprint or micromanaging the weapons industry; rather, they are a means of preserving the U.S. weapons technological base and maintaining a surge capability. Therefore, especially during this time of declining budgets and reduced weapons spending, the U.S. should maintain its GOGO arsenals and ammunition facilities.

Government Ownership with Contractor Operation

GOCOs are a viable alternative to GOGOs. GOCOs allow the government and private industry to form public-private partnerships benefitting both parties. For example, the government can solicit GOCO arrangements for its facilities with excess capacity or its facilities for which it has no use at the present time. Additionally, the government can approach industry to convert a GOGO facility to a GOCO facility if it determines the activities at that facility can be more efficiently run by the private sector. The DoD currently partners with the weapons industry at five different GOCO ammunition facilities. Congress supports such GOCO arrangements for the DoD ammunition facilities, as reflected in Section 4552 of Title 10, USC.⁵⁶ The DoD's GOCO facilities not only assist the DoD in meeting its arms and ammunition needs, but they also help



preserve the weapons private industry base.

Does It Make Sense to GOGO or GOCO?

GOGO and GOCO facilities are most appropriate, fiscally and policy-wise, in certain situations. The following list attempts to capture those scenarios in which it makes sense to use GOGO or GOCO facilities rather than COCO facilities:

- GOGO – When the government is prohibited from outsourcing an activity because it considers such an activity an inherently governmental function
- GOGO or GOCO – When the government can provide such services or manufacture such items more efficiently than the private sector.⁵⁷
- GOGO or GOCO – When the commercial sector does not provide such services or manufacture such items, a market failure.⁵⁸
- GOGO or GOCO – When the government determines “there is a national security reason for maintaining government ownership and control with regard to specific defense items.”⁵⁹
- GOGO or GOCO – When the government wants “to maintain a very large production capability compared to that required for normal peacetime production.”⁶⁰
- GOGO – When the government does not possess “sufficient internal capability” for its Federal employees to “maintain control of missions and operations.”⁶¹

Advantages

- GOGO - As was previously discussed, GOGOs allow the government to maintain technical expertise and a hedge if emergencies arise that require additional surge capacity. Most importantly, the government must turn to GOGOs to carry out its *inherently governmental* functions.
- GOCO - GOCOs can create a symbiotic relationship between government and industry, a distinct advantage over GOGOs. GOCOs can complement, rather than just compete with, private industry. GOCO arrangements can offer industry the opportunity to kill two birds with one stone in times of budget reductions and decreased government spending on contracts: By moving its operations to government-owned facilities (*stone*), the private sector can reduce its overhead expenses (*bird 1*) and preserve its workforce and technical manufacturing expertise (*bird 2*). In addition, GOCOs, like GOGOs, can make use of excess government capacity and/or facilities, which can help the government avoid the need for additional BRAC authorizations to consolidate and/or dispose of excess property. Most importantly, GOCOs provide an opportunity for the private sector to stay involved in government industry.

Disadvantages

- GOGO - GOGOs compete with the private sector rather than help it, especially in times of shrinking budgets. If the government were to insource most of its operations, some contractors may leave the government market entirely instead of competing with the government for limited work. On the financial side, converting COCO functions to GOGO functions could be costly to the government, as it may need to invest in new equipment, hire additional employees, and, in some instances, buy costly intellectual property rights from the private sector.
- GOCO - Although GOCOs could make use of private industry’s workforce, GOCOs could still lead to a *BRAC-like* process in the private sector in which some contractors merge operations



with former competitors and/or dispose of some or all of their facilities. Furthermore, current law and policy documents, including Office of Management and Budget Circular A-76, prohibit GOCOs from performing inherently governmental functions.

GOGO and GOCO are Imperfect Solutions

GOGO and GOCO facilities, more so the latter, can help ensure the weapons industry *grocery stores* will be there when the U.S. Government needs them. GOGOs can help preserve the technical manufacturing expertise and hedge against the need for increased production in the future for critical national security items and processes. (By offering contractors an opportunity to partner with the Federal Government, GOCOs can help preserve the private sector industrial base. History shows that the Federal Government has relied successfully on GOGO and GOCO arrangement during peacetime and drawdowns in military operations in the past to help preserve capabilities essential to national security. The current downturn is no different. In one form or another, government ownership of certain key components of the defense industry can provide viable options when faced with the loss of vital manufacturing capabilities.

SHOULD THE DEPARTMENT OF DEFENSE CHOOSE INDUSTRY WINNERS AND LOSERS?

As the wars in Iraq and Afghanistan wind down and demand for arms decreases the Department of Defense (DoD) must once again make tough choices. It must decide how many personnel to keep, what weapon systems to keep, what weapon systems to buy and all within an air of budget uncertainty. On the other side of the equation are the companies that supply the department. Accustomed to over a decade of high national security spending, defense companies are struggling to come to terms with decreasing defense budgets; lobbying for their industry has increased in an attempt to prove to both the DoD and Congress that their products are the best, vital to national security, vital to jobs, and vital to the survival of their companies. All of this leads to a question...should the Department of Defense begin to choose “winners” and “losers” in the industrial base? Is it time for another “Last Supper”, reminiscent of the 1990s, with the DoD at the head of the table deciding which companies will receive government blessing?

Can the Department of Defense Choose Winners and Losers?

The question of “can”, inferring the ability (both capacity and authority) to perform an action, the DoD pick winners, the answer is yes. The DoD has internal policies that allow it to determine if a system, component, or process, is vital to military readiness, hence national security. This authority also allows the department to take over manufacturing of the system, component, or process to ensure that the production capacity remains.⁶² The only caveat to this is that the DoD must remain within the guidelines laid out in the Federal Acquisition Regulations (FAR). Unfortunately this process has significant flaws.

In February 2014, a senior leader from the Office of Secretary of Defense (OSD), Office of Acquisition, Technology, and Logistics (AT&L) lectured the Weapons Industry Study seminar on the vulnerabilities of the DoD supply chain, not just the final products, but also the supporting and raw materials required to produce the final products. Based on the official’s discussion, the DoD does not have 1) the number of personnel required to accurately map the entire supply chain down to raw material, 2) the expertise to do so; no company does. In order for OSD AT&L to



perform such a function on a constant basis it would need to significantly increase its manning by hiring professional engineers; greatly increasing the personnel budget of OSD. In an age of declining budgets and sky rocking civilian and military personnel costs, this would be a bitter pill for Congress to take. Additionally, performing such an action is outside of the core competencies of the DoD.

The subjectivity of the process leaves significant room for 1) human error, 2) personal preference, and 3) outside influence. From a legal standpoint, “losing” companies would immediately file legal action against the DoD to challenge the findings. From a lobbying standpoint, if the DoD began to pick “winners” and “losers,” congressional and professional lobbying would swamp the DoD with why their company is deserving of the “winning” certification.

Given the authority and capability of the department to perform such actions, is it the right choice? Are we choosing industries that are vital to current systems, but will become, or have already become, obsolete? When the evidence is examined, the DoD has a mixed score when it comes to “winners” and “losers.”

A Mixed Bag of Results

If you exam the general technology that the DoD has helped developed, the DoD has an excellent track record of picking winners. In these instances, the DoD simply said here is a problem that we need solved, industry figure out how to do it. Industry and research institutions took over and solved the problem with little interference from the DoD. As the technology matured, the DoD found ways to integrate the new technologies into military systems, but allowed industry and research institutions to continue working with the technologies for civilian use. The result were technologies that helped change the world.

If you exam the systems and companies that the DoD has picked as winners, the results become much less certain. In many cases, the “winners” were chosen correctly at the time. However, the processes became obsolete over time, but the DoD chose to stick with its “winners.”

Additionally, through numerous site visits to weapons manufacturing facilities, it was observed that the most competitive companies were those that 1) had a diversified product portfolio, 2) had a diversified customer base, 3) had a flexible manufacturing process, and 4) were not reliant on a monopsonistic relationship with the government.

Can the Department of Defense Be Dispassionate and Objective?

While the previous sections focused on whether the DoD could choose winning technologies, systems, and processes, this section focuses on companies themselves and if the DoD can be dispassionate and objective towards them when it comes to selection as a “winner.” In this section the definition of “winning” and “losing” must also be adjusted. Companies that would be considered are those providing a service, function, or product to the DoD deemed so vital that national security would be compromised if that company ceased to exist. In the case of “winning,” it implies that company would be constantly subsidized by the government in order for it to remain in operation. In the case of “losing,” it implies that no subsidies would be received; given the choice of two companies providing the same product to the DoD, the “winning” company would always receive the contract.

The very concept of keeping a company alive through subsidies is riddled with troubling effects. These range from the legality of virtually nationalizing a company, to eliminating the concept of innovation at the “winning” company.



While picking “winners” seems like an easy answer to the problem of assured supply chains, the complexities of the process, the amount of man-years it would require, and the amount of money it would require make it a complex and unpalatable solution. For every company that the DoD chose as a “winner,” funds would have to be taken from operational accounts. The DoD would have an assured supply chain, however, it would not have the funds to perform its primary mission; national defense.

Policy Changes

In order to eliminate the need to pick “winners” and “losers” the DoD must address the trends described above. To do this, the following policies are recommended:

- Encourage Research and Development – increase funding research and development projects, not only at universities, but also at companies wishing to do business with the DoD. If a company has a technology that could provide benefit to the DoD, needs-based funding should be made available to them to develop that technology to a prototype stage. The intellectual property (IP) rights must be maintained by the company during this phase. If the DoD chooses the system for further development, the rights to the IP could be negotiated.
- Plan for Process and Component Obsolescence – As shown, the DoD tends to hold on to “tried and proven” technology and systems well beyond their obsolescence. The DoD must plan for obsolescence, especially in technology driven programs. The DoD should establish a review period for programs and systems to determine the projected obsolescence date of technology and program in plans for technology refresh before that date. This would keep processes fresh, modern, and help eliminate obsolete parts and components. It would also help to ensure that the DoD always had the latest in technology.
- Reduce the Certification Bureaucracy and Expense for Components – Encourage companies to develop new formulations, processes, etc. that maximize production. For vital components such as energetics and explosives, allow the company to maintain the IP for the manufacturing process for a pre-negotiated period of time. After that period, the IP reverts to the DoD.
- Customers Outside of the DoD – The DoD, Congress, and Executive branch must revisit and revise International Traffic in Arms Regulations (ITAR) easing restrictions on sales of systems and components outside of the U.S. This would open markets to U.S. arms manufacturers and reduce their dependency on the DoD, thus establishing market conditions where the DoD does not have to choose “winners” and “losers.”

Conclusion

The Department of Defense has been the genesis and / or the epicenter of a number of technology developments that have changed the world and given the DoD the asymmetric and technologic advantage that has made the U.S. the preeminent military power around the world. The systems that have been developed for the DoD have served the country well. However, when the full picture is viewed, the DoD has also suffered from massive failures of programs, eroding the credibility of the department and the companies that produced the systems. When the “Iron Triangle” is included, obtaining new systems / capabilities, eliminating un-needed capabilities, etc. becomes a complex, highly political, and legal process. When the evidence is reviewed it is difficult to imagine a situation where the DoD could make determination of which defense companies will win / live and which ones will lose / die that would not be tainted by internal (the



DoD) biases, Congressional influence, or external pressure from lobbyists. The decision would immediately be labeled as biased, preferential, and subject to legal rulings. In the end, the DoD would become mired in legal actions, diverting attention from operations.

The need for choosing winners and losers is a problem of the DoD's making. To correct this problem and eliminate the need to choose winners and losers, several policy changes must take place. Together, these approaches would help eliminate choose winners and losers, eliminate the supply chain vulnerabilities that face the DoD due to obsolete processes and components, create jobs by increasing the refresh rate of technologies, and gain political favor from Congress by helping to create jobs for their constituents. Or...the DoD can continue with the status quo, trying to find vacuum tubes for RADARs and creating the need to choose corporate "winners" and "losers" in order to supply an aging arsenal and fleet.





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