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**Analysis of the Size, Accessibility, and Profitability of  
International Defense Sales in Times of U.S. Budget Uncertainty**

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**by**

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## **Abstract**

### **Analysis of the Size, Accessibility, and Profitability of International Defense Sales in Times of U.S. Budget Uncertainty**

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Immediately prior to and following cuts to the U.S. defense budget in 2013, executives and board members from Lockheed Martin, Boeing, BAE Systems, Raytheon, Northrop Grumman, and General Dynamics specifically cited the need to increase international sales to make up for lost U.S. revenue. Some statements predict aggressive international growth in the immediate future, while others take a more moderate or long-term approach. The purpose of this paper is to assess whether the international defense market is sufficiently large, accessible, and profitable for U.S. defense companies to maintain or grow overall revenue and profitability in the face of static or shrinking defense budgets in the United States.

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## **I. Introduction**

Immediately prior to and following cuts to the U.S. defense budget in 2013, executives and board members from Lockheed Martin, Boeing, BAE Systems, Raytheon, Northrop Grumman, and General Dynamics proclaimed their desire to increase international sales to make up for lost U.S. revenue. Some statements predict aggressive international growth in the immediate future, while others take a more moderate or long-term approach. Perhaps the executives actually believe that they can increase sales success abroad. Alternatively, their statements might simply signal confidence in their company and products in the face of a tough budgetary environment. The purpose of this paper is to assess whether the international defense market is sufficiently large, accessible, and profitable for U.S. defense companies to maintain or grow overall revenue and profitability in the face of static or shrinking defense budgets in the United States.

We should be skeptical of broad statements that the international market can make up for lower defense spending in the United States. Given past cuts and an uncertain future for the U.S. defense budget, it seems reasonable for major defense companies to increase their efforts in the international market, diversifying their customer base and revenue streams. If we add up the total spending each year in the overall global defense market, it does seem large enough to compensate for a substantial chunk of lost U.S. revenue. However, after isolating systems procurement spending from spending on small, commodity purchases, excluding countries with defense strategies that rely on manpower more than technology, quantity more than quality, and excluding countries such as China and Russia that the U.S. government deems off-limits for U.S. defense companies' sales, the companies should be less optimistic about the opportunity to increase revenue from international sales.

While sales of established technologies with fully amortized fixed costs may be highly profitable, U.S. defense companies' potential sales opportunities around the world would probably provide less financial benefit. After including the time and cost of winning business country by country, the risks of doing business in developing countries with poor governance, the complications of high offset expectations (technology transfer, direct or indirect investment, etc.), and the regulatory hurdles that limit exports of defense systems, the profitability of any given foreign sale may be quite low, further dampening the prospects that international sales growth could compensate for lost U.S. business. This is important because many of the statements from top executives focus on growing top-line revenue, and selling even a few of the newest top-of-the-line systems would seem to achieve their goal. However, these sales may not do much to improve the profitability of the company. In fact, they may actually hurt. Carefully examining the details of various companies' product lines and the challenges to profitable international sales, we can see that not all companies are equally positioned for international success.

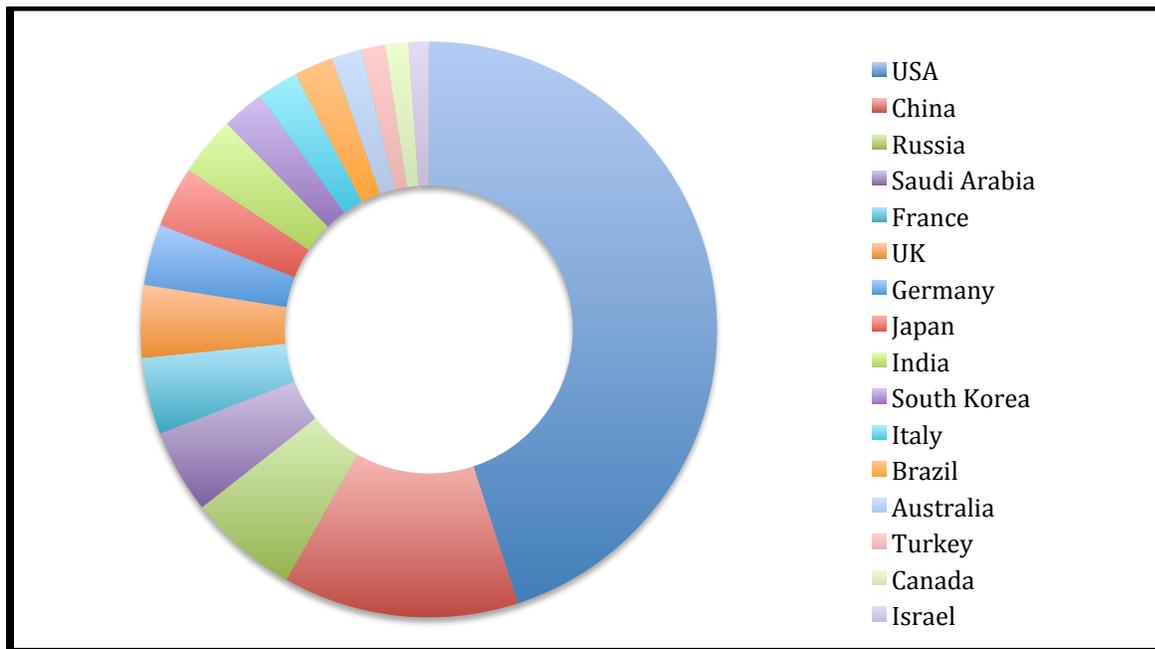
This paper is organized as follows. Section II analyzes the factors that drive procurement in other countries and the accessibility and spending levels of those countries. Section III deepens that analysis with more details on three countries with different defense goals, spending constraints, and regulatory environments. Section IV outlines the changes in the U.S. defense budget and why those changes have compelled defense companies to look for other revenue opportunities abroad. Section V analyzes the performance of the top-six defense companies and some of their marquis products in the international market. Section VI outlines the implications of these findings for future international sales growth.

## II. General Principles of the International Defense Market

### GLOBAL DEFENSE SPENDING

U.S. defense spending dwarfs the spending over every other nation with 45% of the total global spend. After the United States, the second and third biggest defense spenders are China and Russia, both of which are unfriendly, thus off limits for U.S. defense companies for sales of most advanced technology.<sup>1</sup> Saudi Arabia, a country that currently buys a significant amount of U.S. military hardware, is the next biggest market at 5% of total global spend.<sup>2</sup>

Figure 1: Top Global Defense Spenders



(Source: SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>)

Additionally, foreign spending on defense does not necessarily equate to defense spending on advanced technology systems. Some countries rely more on manpower, while others look to the United States to gain a technological edge over their current or potential adversaries and thus buy relatively low-tech weapons systems. Understanding *why* countries choose to buy

<sup>1</sup> SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>

<sup>2</sup> SIPRI Military Expenditure Database 2012.

the weapons they do – and from which companies – should allow defense companies to better target their sales campaigns.

### **DOMESTIC PREFERENCE**

Governments institute domestic preference policies to favor domestic industries for different purposes. Some governments allege that buying domestically ensures a safer supply that is less susceptible to interruption in times of conflict. Others institute such policies for political reasons such as creating or maintaining jobs in a particular district or for nationalist reasons such as in Japan where the national identity is strongly tied to technological prowess.<sup>3</sup> In many cases, the reasons for these policies are a mixture of strategic, political, and economic interests. The defense industry is highly politicized, and keeping stakeholders happy is important.<sup>4</sup> Even technologically advanced countries with strong governance such as the United States has the “Buy America” policy that requires companies to use U.S. suppliers when possible. U.S. defense companies hoping to sell abroad must work with these policies in other countries.

From the end of WWII to the end of the Cold War, supplier preference in the international market was largely determined by whether a given country aligned with the United States or the Soviet Union. Either super power would provide a country with the military support necessary to engage in conflict as the superpower saw fit, sometimes low-tech and sometimes high-tech, sometimes in arms transfers, and sometimes in co-development of industrial capacity. For example, in Europe following WWII, the United States supported Britain, France, and

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<sup>3</sup> For political reasons see: Morton H. Halperin, and Kristen Lomasney, “Playing the Add-On Game in Congress: The Increasing Importance of Constiuent Interests and Budget Constraints in Determining Defense Policy,” in *The Changing Dynamics of U.S. Defense Spending*, ed. Leon V. Sigal, (Westport: Praeger), p. 85-103. For technonationalist reasons, see: Richard J. Samuels, *Rich Nation, Strong Army: National Security and the Technological Transformation of Japan*, (Ithaca: Cornell University Press, 1994).

<sup>4</sup> Harvey M. Sapolsky, Eugene Gholz, and Caitlin Talmadge, *U.S. Defense Politics: The Origins of Security Policy*, (London: Routledge, 2008), p. 391.

Germany in developing and improving various aspects of their defense industrial base. For France this meant multi-billion dollar investments in Dassault and buying the entire first run of the company's planes for the rebuilt French air force.<sup>5</sup>

The end of the Cold War spelled the end of this support for high military spending in many developing countries, although many continue to receive some sort of military investment whether through technology, training, or education.<sup>6</sup> Some countries, however, such as Egypt and Israel, continue to receive strong military support from the United States and have built some defense industrial capacity of their own. Likewise, some developed European countries maintain second-tier defense industrial capacity, such as Sweden and Switzerland, although shrinking domestic military spending has also called into question their long-term viability.<sup>7</sup>

Since then, many countries have attempted to expand their military industrial bases as a way to boost their overall economies and become more self-reliant for their security needs. However, modern defense technologies, especially those high-end products produced by U.S. defense companies such as fighter jets, missiles, radar, and armored vehicles, are not easily developed. Only the largest purchasers of these weapons can maintain economically viable domestic production, and many small- and mid-sized countries only try to create domestic defense industries for simpler technologies like ammunition.<sup>8</sup>

For those countries without an existing military industrial base, or with one that produces only a few, probably low-tech products, it is more cost-effective to import defense technology

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<sup>5</sup> Andrew Moravcsik, "Arms and Autarky," *Daedalus*, Vol. 120, No. 4 (Fall 1991), page 33.

<sup>6</sup> J. Paul Dunne, "Developments in the Global Industry from the End of the Cold War to the mid-2000's," in *The Modern Defense Industry*, ed. Richard Bitzinger (Santa Barbara: Praeger Security International/ABC-CLIO, 2009), 30.

<sup>7</sup> Stephanie Neuman, "Power, Influence, and Hierarchy: Defense Industries in a Unipolar World," in *The Modern Defense Industry*, ed. Richard Bitzinger (Santa Barbara: Praeger Security International/ABC-CLIO, 2009), 78.

<sup>8</sup> Marc R. De Vore (2011): The Arms Collaboration Dilemma: Between Principal- Agent Dynamics and Collective Action Problems, *Security Studies*, 20:4, 624-662

from a major producer such as the United States, China, or Russia, each of which offers a broad array of systems, rather than to try to create a domestic base from scratch. There are some notable exceptions, viz. India, Israel, Brazil, South Korea, South Africa, and Indonesia, which have with varying scale and success established domestic defense industrial bases. However, none have found anything close to self-sufficiency, and all must still import to meet their defense needs.<sup>9</sup>

Not every country needs the newest or best technology, nor could they necessarily afford it if they wanted. Understanding why a given country buys what it buys, and who they buy it from, depends on understanding the underlying factors of civil-military relations, national security strategy, and negotiations over offsets.

#### **CIVIL-MILITARY RELATIONS**

In some countries, militaries operate independently from the rest of the government. The lack of budget oversight can result in poor balancing of defense needs against other public needs, wasteful spending on unnecessary systems, and corruption. Even in countries with strong governance and civilian controls, such as the United States, the often-cited need for secrecy because of the nature of defense may result in a divide between the government and the military.<sup>10</sup>

Strong governance and civilian involvement do not necessarily ease doing business or speed procurement decisions. In fact, the oversight often leads to longer purchasing cycles and tough political battles. The United States, for example, has often faced high-stakes public disagreements between elected officials and the military or Department of Defense. An excellent

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<sup>9</sup> J. Paul Dunne, “Developments in the Global Industry from the End of the Cold War to the mid-2000’s,” 30.

<sup>10</sup> SIPRI, “Transparency and Accountability in Military Spending and Procurement,” <http://www.sipri.org/research/armaments/milex/transparency>, accessed February 18, 2015.

example of this is the attempt by the U.S. Army to pull funding from a tank plant in Lima, Ohio, and the subsequent work of members of the U.S. Congress to find funding for the plant in some capacity.<sup>11</sup>

U.S. defense companies do business with a number of countries with strong governance structures, including Western European countries, Australia, Japan, Israel, and South Korea. These countries also tend to have strong economies and larger defense budgets, and tend to be friendly with the United States. This is not to say there are no civilians in these countries who influence procurement decisions for political, financial, or nationalist reasons. The level of corruption is significantly lower in these countries, but they are not immune from “pork barrel spending” or choosing poor quality domestic options over high quality foreign options due to political pressure. However, even in cases where other countries have developed some defense industries of their own, they still procure top-of-the-line technologies from U.S. companies. The large budgets, transparency, and strong civilian oversight in their procurement process means they are accessible for defense companies. Conversely, that same oversight slows the procurement process, prolonging the sales cycle for defense companies.

Other buyers struggle with corruption and/or questionable civilian oversight of military spending, including Brazil, India, Saudi Arabia, other Middle Eastern countries, and some countries in Eastern Europe. Often times, these countries do not follow a strategy of always buying the best products to ensure national security, instead preferring to procure technologies that will maintain power and influence. Depending on the level of corruption and questionable oversight, companies from the United States are legally constrained in what, if anything, they

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<sup>11</sup> Brian Bull, “Plant Pleads to Stay Afloat, but Army Says ‘No Tanks’,” *NPR*, July 25, 2012, <http://www.npr.org/2012/07/25/157256332/plant-pleads-to-stay-afloat-but-army-says-no-tanks>.

can sell. This is due to the strong regulations set forth in the Foreign Corrupt Practices Act (FCPA) and International Traffic in Arms Regulations (ITAR).

At its core, the FCPA requires U.S. companies to operate under the same ethical code when they do business abroad as they do at home. This means companies cannot use bribery or extraordinary influence to win deals.<sup>12</sup> One of the most famous examples of a defense company engaging in bribery is the Lockheed Corp. bribery scandal that broke in 1976 and helped lead to the creation of the FCPA. Over the course of decades, Lockheed paid high-ranking officials millions of dollars to influence procurement decisions. The extent of Lockheed's payments in both geographic reach and total dollar amount was shocking. Included in the list of countries were those with traditionally strong oversight of their defense industries, such as Japan, and those with typically weak oversight such as Saudi Arabia.<sup>13</sup> As punishment, Lockheed paid over \$20 million in fines. More recently, an Italian court found Finmeccanica's CEO Orsi guilty of engaging in a kick-back scheme with officials in the Indian government for the purchase of 12 helicopters valued at \$715 million.<sup>14</sup>

The implication of the different levels of civil-military relations and the corresponding legal oversight is that some markets with weak governance become less accessible or entirely inaccessible for U.S. companies due to U.S. laws and regulations. This further diminishes revenue potential of the international market. Defense companies in other countries with less stringent regulations and oversight such as Russia or China may find that they have more access or ability to influence officials in countries with poor civil military relations, but that does not

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<sup>12</sup> "Foreign Corrupt Practices Act," The United States Department of Justice, <http://www.justice.gov/criminal/fraud/fcpa/>.

<sup>13</sup> David Leigh and Rob Evans, "The Lockheed Scandal," *The Guardian*, <http://www.theguardian.com/world/2007/jun/08/bae35>

<sup>14</sup> Emilio Parodi, "Finmeccanica looks to rebuild India ties after former head convicted," *Reuters*, <http://in.reuters.com/article/2014/10/09/finmeccanica-india-idINKCN0HY14Y20141009>

necessarily guarantee a sale. Buyers' needs and ability to pay still play a large role, and the top U.S. defense companies still maintain a reputation of producing the best quality product.

Whether countries want or need the best, when good enough will do, is another question.<sup>15</sup>

#### **BUYERS AND SUPPLIERS: QUANTITY VS. QUALITY**

Countries that buy military hardware can be divided into roughly three groups: those that seek quality, those that seek quantity, and those that "straddle" the line between both. Countries that pursue a "quality" strategy are, largely, the United States, Western European countries, Australia, Saudi Arabia, Singapore, South Korea, and Japan. These countries have the financial capability to procure first what they need and then what they want.

Countries that follow the quantity approach may do so for three main reasons. First, from a threat standpoint, these countries have no plan or desire to engage in conflict with major powers. Their security needs are to protect themselves from neighboring countries. Second, from an effectiveness standpoint, they may view the cost-benefit of procuring a few highly advanced weapons to be less favorable than procuring greater numbers of less advanced weapons. Third, they simply cannot afford high-quality weapons, even if they want them. In these countries, China and Russia are the main competitors. For example, using the strategy of price and quantity over quality, China has recently successfully competed against U.S. companies for contracts in countries such as Turkey.<sup>16</sup> China's expanding defense industrial capability, though currently vastly overshadowed by the combined capability of U.S. and U.K. producers, is likely to increasingly compete for a larger share of the international defense market in countries that pursue quantity over quality.

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<sup>15</sup> Richard A. Bitzinger, "The Global Arms Trade: "Hyundaisation" Threat from New Suppliers," *RSIS Commentary*, No. 098 – April 23, 2015.

<sup>16</sup> David Lerman and Robert Wall, "U.S. Defense Contractors Focus on Foreign Buyers," *Bloomberg*, November 13, 2014, <http://www.bloomberg.com/bw/articles/2013-11-14/2014-outlook-u-dot-s-dot-defense-contractors-focus-on-foreign-buyers>

Countries that straddle the line between quality and quantity include rising global powers such as China and India, and regional powers such as Russia, Brazil, South Africa, and Iran. India, for example, with its large population, has followed the lead of its economic competitive advantage and built a military that is large in number but not necessarily up to date with technological advances, though at the same time India has made commitments to modernize its military and has bought a handful of high-end systems like aircraft carriers and ballistic missiles.

Because the companies under consideration produce high-end products almost exclusively, the focus of the country case studies will be on countries that are moving from the quantity approach towards the quality approach. These markets represent new opportunities for the top-six defense companies in terms of revenue.

#### **OFFSETS**

Buyers negotiate offsets to establish, expand, and improve domestic industries. They are commitments from foreign suppliers to invest in or purchase the products of the buyer's domestic industry. Offsets are defined as either direct or indirect. Direct offsets are directly related to the items or services sold and exported by the U.S. company – for example, the company agrees to use local labor or buy subsystems or components or to give service contracts related to the sale of weapons systems to firms in the buying country. The effect is that the exporting company reduces the overall amount of work it does. In cases where profits are generated from a percentage mark-up on the cost of completed work, overall profits will decline as total work declines. In contrast, indirect offsets are those that are unrelated to the sale and export of a system or service. In this case, the company may fund schools or make other investments in the buying country or may buy unrelated export products from the buying

company for resale in global markets.<sup>17</sup> Whether direct or indirect, offsets are an industrial or commercial benefit provided by a company to a foreign government to secure the purchase of military goods or services. These good or services include “co-production, licensed production, subcontracting, technology transfer, in country procurement, marketing, financial assistance, and joint ventures.”<sup>18</sup>

Officially, the U.S. Department of Defense sees offsets as market-distorting and inefficient.<sup>19</sup> However, the Department of Defense allows their use. The most important aspect of offsets for defense companies is the cost and risk they represent for the company. Some countries, such as India, have particularly high offset requirements, as will be discussed below in the country case studies. This makes doing business in the countries more difficult and less profitable. Most importantly, the threat of lost intellectual property in coproduction or joint venture scenarios is a serious threat to both the company’s competitiveness and the overall security of the United States. Because of this, the U.S. has instituted stringent reporting and authorization procedures in addition to the ITAR restrictions for defense companies that include offsets as part of their export sales.<sup>20</sup>

### **MAKING THE SALE: FOREIGN MILITARY SALES VS. DIRECT COMMERCIAL SALES**

After a company takes into account the revenue potential in a foreign product, it can sell its products through two mechanisms. First, Foreign Military Sales (FMS) are purchases facilitated by the U.S. Department of Defense through its Defense Security Cooperation Agency (DSCA). Importantly, FMS are expressly not to provide private defense contractors with easier

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<sup>17</sup> Bureau of Industry and Security, U.S. Department of Commerce “SIES FAQ,” <http://www.bis.doc.gov/index.php/2011-09-20-13-26-57?view=category&id=55#subcat56>

<sup>18</sup> Defense Procurement and Acquisition Policy, “Offsets of Foreign Military Sales,” [http://www.acq.osd.mil/dpap/cpic/ic/offsets\\_of\\_foreign\\_military\\_sales.html#\\_ftn1%23\\_ftn1](http://www.acq.osd.mil/dpap/cpic/ic/offsets_of_foreign_military_sales.html#_ftn1%23_ftn1)

<sup>19</sup> Defense Procurement and Acquisition Policy, “Offsets of Foreign Military Sales”.

<sup>20</sup> Defense Procurement and Acquisition Policy, “Offsets of Foreign Military Sales”.

access to the international market. Rather, the United States facilitates these purchases to build up the “partner capacity” of friendly countries or those countries such as Afghanistan and Iraq where the United States is trying to establish some semblance of stability. Unless waived, the FMS purchaser is often required to pay part of the cost of R&D and production.<sup>21</sup> The one aspect of FMS that is most important in distinguishing it from Direct Commercial Sales (DCS) is that the most advanced technologies are designated as “FMS only.”<sup>22</sup> This means that for foreign countries to access the top of the line systems, they must work with and through the U.S. government.

In contrast, DCS operate like the sale of any other commercial good except with the added parameters of the ITAR, which restrict the export of certain defense technologies. Under DCS sales, the buyer and seller are responsible for their own negotiations, contracting, and payments. Direct commercial sales make up the majority of defense sales in dollar value. This is markedly true in the sale of satellites, communications and electronic equipment, and parts exports, where DCS sales are approximately 80% of total sales.<sup>23</sup> This reliance on DCS sales highlights the need for defense companies to actively pursue international sales if they wish to expand their international revenue rather than rely on deals facilitated through the FMS mechanism.

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<sup>21</sup> Gilman, Derek, “Foreign Military Sales,” page 9, Defense Security Cooperation Agency, September 30, 2014.

<sup>22</sup> Gilman, Derek, “Foreign Military Sales”, page 37.

<sup>23</sup> Gilman, Derek, “Foreign Military Sales”, page 1.

### III. Country Case Studies

This section discusses India, Brazil, and Saudi Arabia. All three countries are rising global powers, have large and increasing defense budgets, and raise special regulatory concerns. The purpose of these case studies is twofold. First, they are meant to provide more detailed analysis of the reasons why countries choose what weapon systems to buy, who they buy them from, and the typical extra obligations they place on a company to complete the sale. Second, they are meant to dispel the notion of a monolithic “international market” by highlighting the difficulties ahead for any defense company hoping to make up for lost U.S. sales by increasing sales abroad. Understanding both of these points is important because they require a company to have country-specific sales strategies and hire the experts to execute those strategies in vastly different political, legal, business, and cultural environments.

#### INDIA

The Indian defense market, like many other market sectors in India, is defined by its sheer size and notorious inaccessibility for U.S. companies due to bureaucratic hurdles, offset requirements, and FCPA concerns. Although India’s budget through the 1990’s and early 2000’s was relatively stagnant, recent years have seen a drastic increase in military spending. In 2014, India’s overall defense budget was approximately \$37.7 billion. That budget is expected to grow to \$65.4 billion by 2020.<sup>24</sup> Importantly for defense companies, half of India’s defense spending has historically gone towards procurement.<sup>25</sup> With its neighbors China and Pakistan also ramping up their military capabilities, India expects to update old technology and is projected to spend

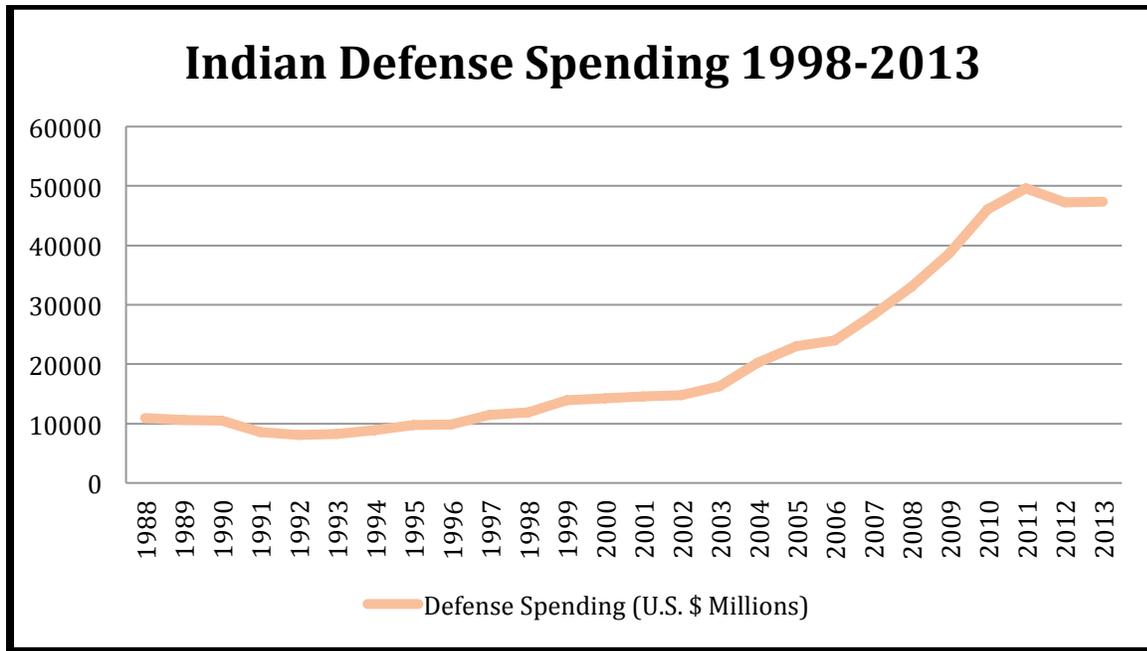
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<sup>24</sup> Santanu Choudhury, “India Increases Defense Budget to \$37.7 Billion,” *The Wall Street Journal*, <http://www.wsj.com/articles/SB10001424127887324662404578331762186925312>

<sup>25</sup> Keith Hayward, “The Globalization of Defense Industries,” in *The Modern Defense Industry*, ed. Richard Bitzinger (Santa Barbara: Praeger Security International/ABC-CLIO, 2009), 113.

approximately \$100-150 billion between 2012 and 2020 to do so.<sup>26</sup> Key ongoing acquisition from top defense companies includes the purchases of 15 Chinook CH-47F helicopters and 22 Ah-64D Block-III Apache attack helicopters, both from Boeing.<sup>27</sup>

Figure 2: Indian Defense Spending 1988-2014



(Source: SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>)

The country has long tried to fulfill its defense needs through domestic production but has continually faced setbacks and extended timelines. For example, India initiated the “Tejas” light combat aircraft program in 1983, but the first functional aircraft did not roll off the production line until January 2015, a 32-year wait. Although 60% of the Tejas production is domestic to India, so few of the aircraft will be built (with no prospect for exports) that the per-

<sup>26</sup> Neelu, Khatri, “Ins and Outs of Indian Defense,” *Aviation Week and Space Technology*, vol. 174, issue 9, p. 58.

<sup>27</sup> Santanu Choudhury, “India Increases Defense Budget to \$37.7 Billion,” *The Wall Street Journal*, February 28, 2013, <http://www.wsj.com/articles/SB10001424127887324662404578331762186925312>

unit cost of the aircraft is likely exorbitantly high.<sup>28</sup> Due to similar production difficulties across other domestic development projects, India's is still highly import-dependent for its defense needs.<sup>29</sup> For the foreseeable future, India will rely heavily on imports for its defense technology needs, although bureaucratic hurdles make imports exceptionally challenging.

India's offset requirements make it difficult for top international defense companies to secure even moderate-sized deals. Sales above \$63 million require an offset minimum of 30% of the contract value. Unlike other countries where a company can choose to meet an offset requirement by spending in indirect areas such as infrastructure or agriculture, India requires the entire defense offset go towards direct defense, security, or aviation industry development.<sup>30</sup> To fulfill this offset obligation, companies are often expected to manufacture the technology in India through a "partner" Indian company. This bureaucratic mandate does not match the real capabilities of Indian companies, however, as most are woefully unprepared to manufacture even mid-level defense products. This means that the defense company must transfer technology or intellectual property to the "partner" Indian company to get it up to a minimum standard. Not only would this expose the defense company to the risk of creating a future competitor, but also it increases the likelihood that the U.S. government will deny the request for permission to export to a near guarantee.<sup>31</sup>

The U.S. Department of Defense has worked to increase some U.S.-India co-production and co-development as part of a Defense Trade and Technology Initiative. This agreement

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<sup>28</sup> Economic Times, "After 32 years, India finally gets LCA Tejas aircraft," January 17, 2015, [http://articles.economictimes.indiatimes.com/2015-01-17/news/58175338\\_1\\_lca-tejas-defence-minister-manohar-parrkar-final-operational-clearance#slide1](http://articles.economictimes.indiatimes.com/2015-01-17/news/58175338_1_lca-tejas-defence-minister-manohar-parrkar-final-operational-clearance#slide1)

<sup>29</sup> J. Paul Dunne, "Developments in the Global Industry from the End of the Cold War to the mid-2000's," in *The Modern Defense Industry*, ed. Richard Bitzinger (Santa Barbara: Praeger Security International/ABC-CLIO, 2009), 30.

<sup>30</sup> Neelu, Khatri, "Ins and Outs of Indian Defense," *Aviation Week and Space Technology*, vol. 174, issue 9, p. 58.

<sup>31</sup> Neelu, Khatri, "Ins and Outs of Indian Defense".

focuses on low-end technology such as the Raven UAV and different modules for the C-130J aircraft, not the advanced technology that India desires.<sup>32</sup> The Indian offset requirements remain a significant hurdle for U.S.-India co-production or co-development of anything resembling advanced technology.<sup>33</sup>

For top defense companies, this means that either they must keep their deals small enough to stay under the \$63 million threshold, or they must brave the bureaucratic quagmire of Indian defense. The recent high-profile corruption and bribery scandals of foreign defense companies trying to secure high-dollar long-term deals in India certainly have not been encouraging for U.S. defense companies looking to expand sales there.<sup>34</sup> India's full potential as a market seems unlikely to be realized any time soon.

## **BRAZIL**

Brazil's 2015 defense budget is approximately \$48.2 billion dollars, with \$13.4 billion going to procurement. Like India, Brazil is also in the process of updating its old systems, buying new technologies, and investing in its domestic production.<sup>35</sup> Brazil's defense spending throughout the 1990's and early 2000's was extremely low as the country focused on continuing its economic growth. The mid to later 2000's saw a rapid growth of Brazilian defense spending, followed by some cuts in the past few years.

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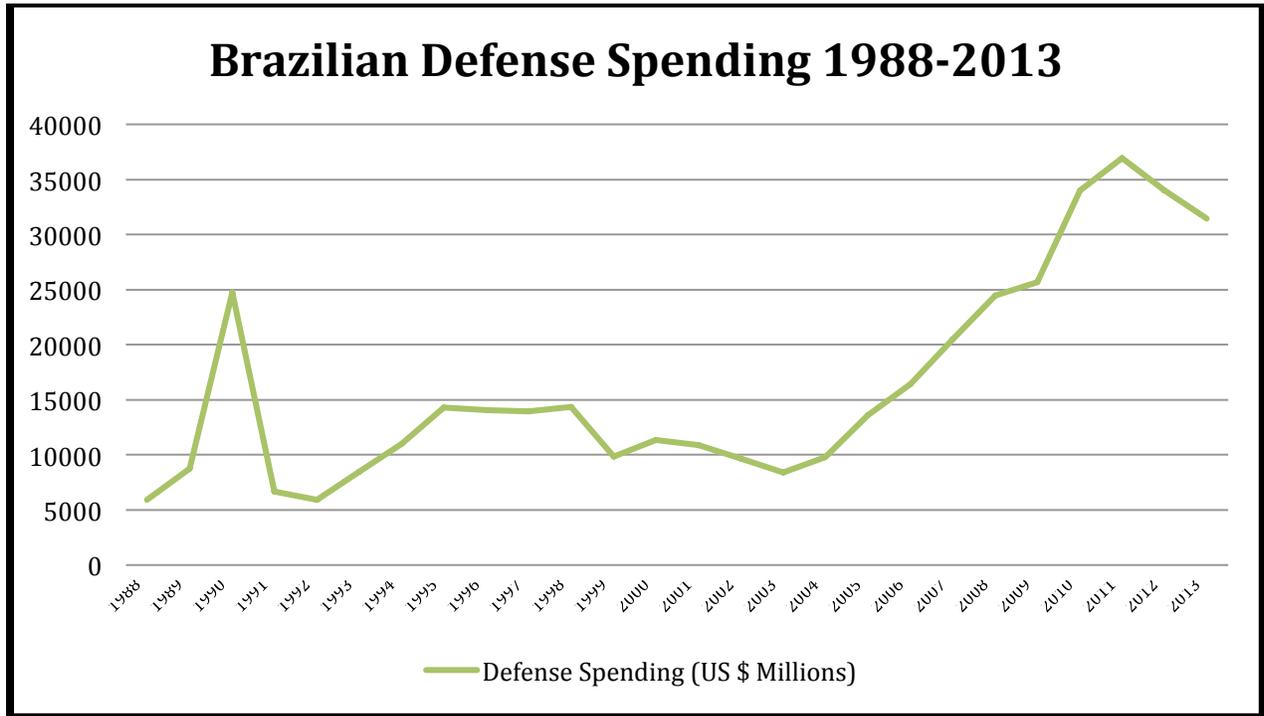
<sup>32</sup> Vivek Raghuvanshi, "India, U.S. Advance Strategic Relations," *Defense News*, January 28, 2015, <http://www.defensenews.com/story/defense/policy-budget/industry/2015/01/28/india-obama-modi-dtti-us-agreement-weapons-coproduce-bilateral-russia/22457599/>

<sup>33</sup> Megan Eckstein, "Carter Unveils New Collaboration Opportunities Between U.S., Indian Defense Industries," *Defense Daily*, Vol. 260 No. 1, September 30, 2013.

<sup>34</sup> Mark Magnier, "India Bribery Scandal Threatens to Ground \$750-million Helicopter Deal," *Los Angeles Times*, February 13, 2013, <http://articles.latimes.com/2013/feb/13/world/la-fg-wn-india-helicopter-20120213>

<sup>35</sup> The Brazilian Defense Sector - Market Opportunity and Entry Strategy, Analyses and Forecasts to 2015 - Market Intelligence Report - ICD Research – June 2012

Figure 3: Brazilian Defense Spending 1988-2013



(Source: SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>)

Unlike India, Brazil does not have well-equipped and hostile neighbors that have compelled it to develop a domestic defense industrial base.<sup>36</sup> Instead, Brazil has pursued a strategy of limited defense industrialization in the areas of transport aircraft, submarines, helicopters, armored vehicles, rockets, and satellite-based imaging for domestic consumption and profitable export.<sup>37</sup> Also due to the low threat level it faces, Brazil does not always pursue a strategy of procuring the most advanced technology available. The most recent example of this is Brazil’s purchase of 36 Saab Gripen fighter jets rather than Boeing’s F/A-18 or Dassault’s Rafale. The total number of planes planned for purchase is 108.<sup>38</sup> The Gripen is, by many accounts, less capable than either of the other two options, but it costs half of the next cheapest

<sup>36</sup> J.D. Kenneth Boutin, ‘Emerging Defense Industries: Prospects and Implications,’ in *The Modern Defense Industry*, ed. Richard Bitzinger (Santa Barbara: Praeger Security International/ABC-CLIO, 2009), 236-237.

<sup>37</sup> The Brazilian Defense Sector - Market Opportunity and Entry Strategy, Analyses and Forecasts to 2015 - Market Intelligence Report - ICD Research – June 2012

<sup>38</sup> Defense Industry Daily, “Brazil Buys Saab’s JAS-39 E/F Gripen over Rafale, Super Hornet,” November 19, 2014.

plane in terms of estimated total lifetime costs. The takeaway from this high-stakes and high-dollar multinational competition is that Brazil does not see the strategic need of matching superpower in capability. Instead, Brazil's main focus is ensuring relative regional calm and patrolling and protecting its coasts and the massive Amazon forest.<sup>39</sup>

In addition to its emphasis on domestic production, Brazil imposes extensive offset requirements. Most deals require direct offsets in the form of co-production or technology transfers equal to 100% of the contract's value, with a minimum contract threshold of only \$1 million.<sup>40</sup> Deals with 100% offset requirement can still be profitable because the exporting country can get extra credit in the offset calculation – a multiplier or accelerator value that pushes the accounting towards the 100% requirement – by including particularly desirable offsets such as technology transfer or co-production. For example, if Brazil is in contract negotiations over a \$100 million deal with a 100% offset requirement, and it wants companies to commit to more technology transfers, Brazil can put a high multiplier on any technology transferred. If a company transfers technology worth say, \$25 million, and the multiplier is “4x,” then the company has covered its offset condition. The technology transfers do, however, increase the risk of intellectual property theft. While few companies have been willing to comply with the technology transfer requirements, companies such as Lockheed Martin, Boeing, and Northrop Grumman have successfully co-produced in Brazil, taking advantage of the relatively inexpensive local labor.<sup>41</sup> As with doing business in India, however, the fear of losing intellectual property, both for the company and the United States, has kept the market share of

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<sup>39</sup> Defense Industry Daily, “Brazil Buys Saab’s JAS-39 E/F Gripen over Rafale, Super Hornet”.

<sup>40</sup> The Brazilian Defense Industry to 2017, *PR Newswire*, January 22, 2013.

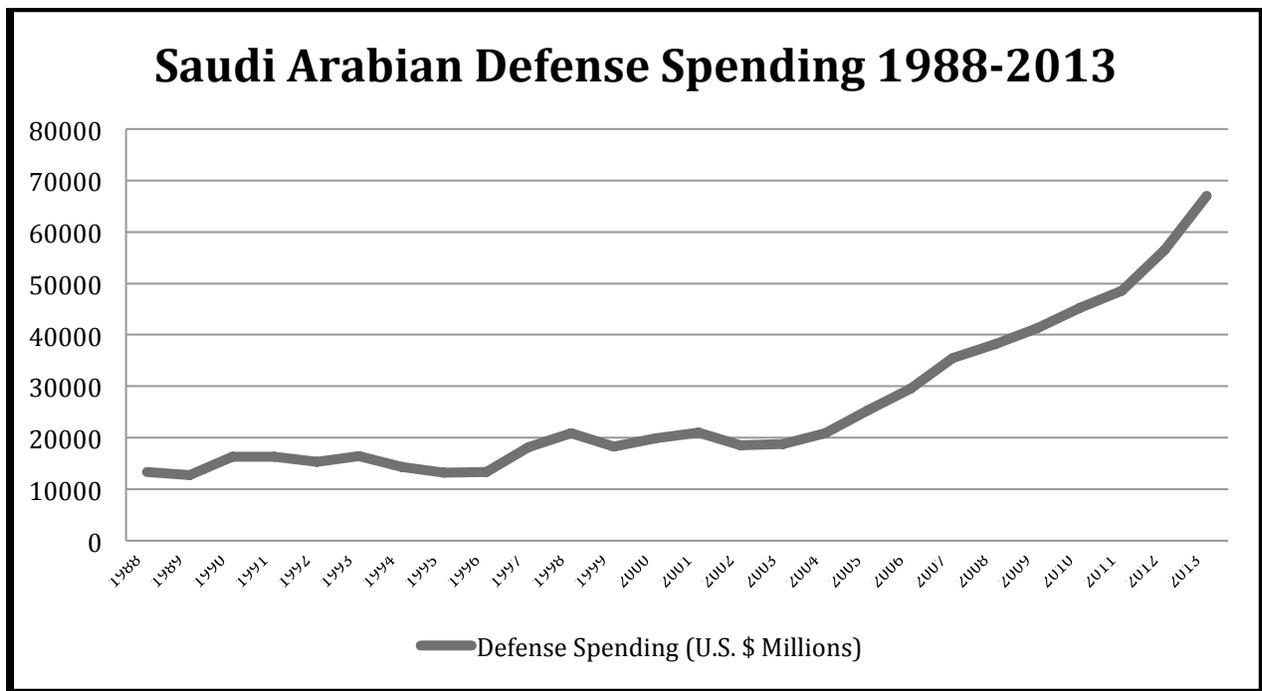
<sup>41</sup> The Brazilian Defense Sector - Market Opportunity and Entry Strategy, Analyses and Forecasts to 2015 - Market Intelligence Report - ICD Research – June 2012

U.S. companies at 16%, barely half the market share of French companies.<sup>42</sup> For the top defense companies, Brazil represents both an attractive potential market and a possible future competitor in low-to-mid quality technologies.

**SAUDI ARABIA**

Saudi Arabia’s military spending grew by over 350% from 2003-2013, reaching \$67 billion in 2013.<sup>43</sup> In 2014, the country passed India and China to become the world’s biggest importer of defense technologies, and it ranks fourth in the world in total spend after the United States, China, and Russia.<sup>44</sup>

Figure 4: Saudi Arabian Defense Spending 1988-2013



(Source: SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>)

<sup>42</sup> E. Richard Downes, “Trust, Engagement, and Technology Transfer: Underpinnings for U.S.-Brazil Defense Cooperation,” *Institute for National Strategic Studies-Strategic Forum*, August 2012, p 3-12.

<sup>43</sup> SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>

<sup>44</sup> “Saudi Arabia Eclipses India as World’s Largest Weapons Importer,” *Jerusalem Post*, March 8, 2015, <http://www.jpost.com/Middle-East/Saudi-Arabia-eclipses-India-as-worlds-largest-weapons-importer-393262>

Flush with oil revenues, Saudi Arabia has purchased and continues to purchase top-of-the-line U.S. military equipment in large volumes.<sup>45</sup> Part of the strategic reason for spending so much on defense is to stay competitive in the region with Iran and, previously, Iraq. Compared side by side, these countries are armed with similar numbers of each kind of equipment.<sup>46</sup> In some cases, Saudi Arabia has found the United States unwilling to allow defense companies to sell some high-end technologies due to fears that the sale would threaten the overall security of Israel.<sup>47</sup>

The country has a much more flexible offset policy than either Brazil or India, which, when combined with their penchant for high-end products, makes them a favorite target of U.S. defense companies' sales efforts. For example, Boeing has sold both commercial and defense products to the Saudi government for 70 years.<sup>48</sup> Saudi Arabia pursues both direct and indirect offsets, generally at 35% of total contract cost, with a particular focus on improving its high-end manufacturing capabilities, its health research facilities, and its education resources.<sup>49</sup> This flexibility also allows Saudi Arabia to develop its economy as it sees fit instead of pigeonholing all potential funds into defense-industrial related projects.<sup>50</sup>

Saudi Arabia's willingness to buy top-end U.S. military hardware without other countries' almost impossible offset expectations have made it, and will continue to make it, a top target of U.S. defense companies looking to expand internationally. The bigger worry for defense companies is the level of competition they face amongst each other fighting for the same piece of

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<sup>45</sup> "Saudi Arabia: Increased Security: Defence Offsets Programme Helps to Create Local Benefits," Oxford Business Group.

<sup>46</sup> Anthony Cordesman, "Saudi Arabia Enters the Twenty-first Century: The military and international security dimensions," (Westport: Greenwood Publishing Group, 2003), 3-9.

<sup>47</sup> "Saudi Arabia Country Profile," *FAS.org*, [http://fas.org/asmp/profiles/saudi\\_arabia.htm](http://fas.org/asmp/profiles/saudi_arabia.htm), accessed March 3, 2015.

<sup>48</sup> "Boeing in the Kingdom of Saudi Arabia Background," Boeing, revised February 2015.

<sup>49</sup> "Saudi Arabia Country Profile," *FAS.org*.

<sup>50</sup> M.A. Ramady, "The Saudi Arabian Economy: Policies, Achievements and Challenges," (New York: Springer, 2005).

Saudi Arabian defense spending, especially from defense companies from the United Kingdom, from small arms to vehicles and aircraft. In fact, Saudi Arabia has been the biggest purchaser of defense technologies from the United Kingdom.<sup>51</sup> This increased competition likely means defense companies will need to lower prices to compete when selling comparable defense systems.

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<sup>51</sup> Richard Norton-Taylor, "Saudis and Egypt among biggest markets for UK arms despite human rights breaches," *The Guardian*, June 23, 2014, <http://www.theguardian.com/world/defence-and-security-blog/2014/jun/23/egypt-saudi-arabia-arms-sales-human-rights>.

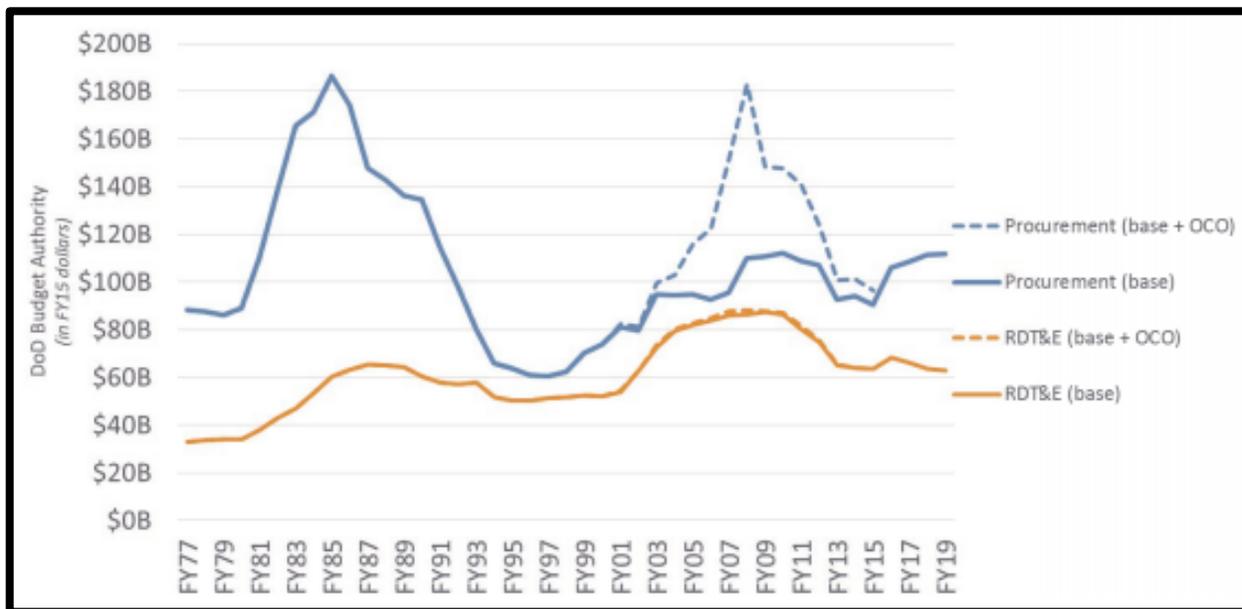
## IV. Changes in the U.S. Defense Procurement Budget

### DEFENSE PROCUREMENT SPENDING: 2001-2013

U.S. defense spending since the end of the Cold War has seen both deep cuts and steep increases.

Following the terrorist attacks on September 11, 2001, and during the subsequent wars in Afghanistan and Iraq, overall defense spending rapidly increased.<sup>52</sup> Procurement spending during this period followed the same trajectory, spiking between 2007 and 2009.

Figure 5: U.S. Procurement and RDT&E Spending 1977-2019



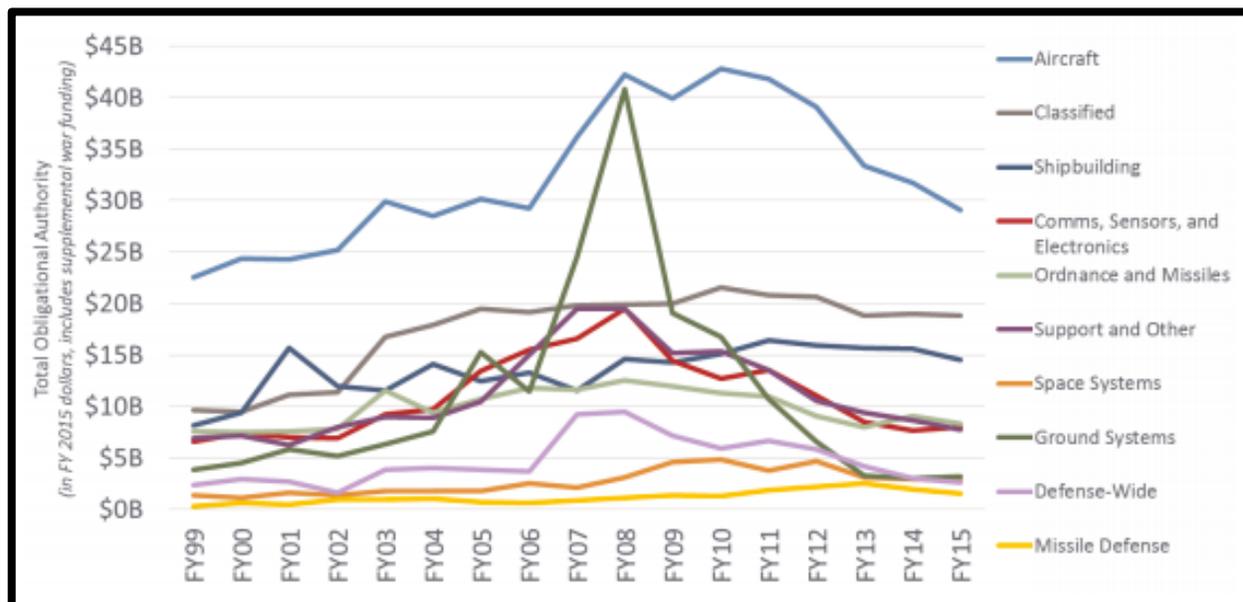
(Source: Todd Harrison, “Analysis of the FY 2014 Defense Budget,” *Center for Strategic and Budgetary Assessments*)

Through disaggregating overall procurement spending into funding by system type, it is easier to understand the ways that the situation on the ground in Afghanistan and Iraq drove funding decisions, creating particular budget winners. Even as the overall procurement budget during this period rose, some line items remained stable while others spiked dramatically. For defense companies, this means that some experienced no or marginal increases in overall revenue, some

<sup>52</sup> Richard Bitzinger, “Introduction: Challenges Facing the Global Arms Industry in the 21<sup>st</sup> Century,” *The Modern Defense Industry*, ed. Richard Bitzinger (Santa Barbara: Praeger Security International/ABC-CLIO, 2009), 1-5.

saw significant but short-lived gains, and others saw great and sustained growth of demand for their products.

Figure 6: U.S. Defense Spending by Technology Type



(Source: Todd Harrison, “Analysis of the FY 2014 Defense Budget,” *Center for Strategic and Budgetary Assessments*)

For example, ground systems spending rose substantially from approximately 2005 to 2008. The Mine Resistant Ambush Protected (MRAP) vehicle drove much of the increased spending on ground systems at a total price of \$45 billion, because politicians and military planners reacted to the effective use of improvised explosive devices against U.S. troops.<sup>53</sup> This reactionary spending has come under harsh scrutiny; some studies suggest that the high-priced vehicle was no better than much-less-expensive alternatives.<sup>54</sup> This criticism is all the more powerful as many thousands of the vehicles were left to rust overseas as they were too expensive to ship back to the United States after the wars, and some have fallen into the hands of extremist

<sup>53</sup> Todd Harrison, “Analysis of the FY 2014 Defense Budget,” *Center for Strategic Budgetary Assessments*, 25.

<sup>54</sup> Chris Rohlf and Ryan Sullivan, “The MRAP Boondoggle,” *Foreign Affairs*, July 16, 2012, <http://www.foreignaffairs.com/articles/137800/chris-rohlf-and-ryan-sullivan/the-mrap-boondoggle>.

groups such as ISIL.<sup>55</sup> While companies that made different variants of the MRAP earned high revenues during this period, their time as “budget winners” was relatively short.

In contrast, the emergence of unmanned aircraft technology has created a sustained domestic market. Aircraft spending rose dramatically during the 2005-2010 period, some of which was due to increased spending on unmanned aircraft, particularly the MQ-1 Predator and MQ-9 Reaper.<sup>56</sup> Although aircraft spending has declined since the peak in 2010, the performance of individual programs such as unmanned aircraft for U.S. operations has driven international demand. In February, 2015, President Obama released a new policy allowing U.S. allies to purchase some models of U.S.-made unmanned aircraft on a case-by-case basis.<sup>57</sup>

Section V provides more detailed analyses of the top-six defense companies on a company-by-company and a selected product-by-product basis. However, the general principle that increased defense spending overall does not necessarily increase revenue for all defense companies and all products holds true. This idea seems to be all the more dramatic during war-time, when procurement decisions in the face of political pressure or a changing strategic environment lead to reactionary purchases with possibly less-than-ideal long-term outcomes. For winners with long production runs in the United States, however, their success becomes potentially all the more valuable if they can sell into and win international buyers.

#### **DEFENSE SPENDING: 2013 SEQUESTRATION TO PRESENT**

The automatic spending cuts in 2013, a result of the Congress’ inaction in passing a budget that met the requirements in the Budget Control Act of 2011, resulted in a 9% decrease in

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<sup>55</sup> Richard Sisk, “Airstrikes Hit MRAPs and Humvees Captured by ISIL,” *Military.com*, August 15, 2014, <http://www.military.com/daily-news/2014/08/15/airstrikes-hit-mrap-and-humvees-captured-by-isil.html>

<sup>56</sup> Todd Harrison, “Analysis of the FY 2014 Defense Budget,” *Center for Strategic Budgetary Assessments*, 25.

<sup>57</sup> W.J. Hennigan, “Obama Administration to Allow Allied Countries to Buy Military Drones,” *Los Angeles Times*, February 17, 2015, <http://www.latimes.com/nation/la-na-drone-sales-20150217-story.html>

procurement spending from \$89 billion to \$81 billion.<sup>58</sup> Not all companies and products suffered equally, however. For example, programs costing \$500 million or more fared considerably better in the face of budget cuts than lower-cost programs.<sup>59</sup> Generally, the top-six defense companies win the majority of the big-ticket programs, due to their unique capabilities and experience at researching, developing, and producing the most advanced weapon systems in the world, which also come at a hefty price. However, the top-six defense companies did not go completely unscathed in the cuts. To make the mandated budget numbers, the budget cut the overall number of F-35's purchased by one whole squadron, reduced investment in the Global Hawk and Predator unmanned aircraft, and eliminated planned purchases of the Reaper unmanned aircraft in future years.<sup>60</sup> The international market did not prove to be the answer immediately following sequestration, because the change in spending was simply too large and too sudden to overcome in the short-term.<sup>61</sup>

The situation has proven to be less dire in the two years since sequestration than originally predicted. Although the budget in 2014 remained stagnant at .24% growth and 2015 saw a shrinking budget, the President and the Department of Defense have both proposed spending increases for 2016.<sup>62</sup> Although the proposed increase in spending is a generally positive sign for defense companies, actual passage of that budget would require Congress to void the spending targets from the Budget Control Act, which might be too politically costly. Even if Congress passes a budget with a higher topline, it may simply trigger further across-the-board

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<sup>58</sup> Jesse Ellman, Gregory Sanders, and Rhys McCormick, "U.S. Department of Defense Contract Spending and the Industrial Base, 2000-2013," *CSIS*.

<sup>59</sup> Jesse Ellman, et al., "U.S. Department of Defense Contract Spending and the Industrial Base."

<sup>60</sup> U.S. Department of Defense, "Estimated Impacts of Sequestration-Level Funding," April 2014.

<sup>61</sup> David Lerman and Robert Wall, "U.S. Defense Contractors Focus on Foreign Buyers," *Bloomberg*, November 14, 2013, <http://www.bloomberg.com/bw/articles/2013-11-14/2014-outlook-u-dot-s-dot-defense-contractors-focus-on-foreign-buyers>

<sup>62</sup> Department of Defense FY 2016 Budget Proposal, [http://www.defense.gov/home/features/2015/0215\\_budget/](http://www.defense.gov/home/features/2015/0215_budget/)

sequestration.<sup>63</sup> This uncertainty is one of the driving factors that top executives at defense companies cite as the reason for expanding their international sales efforts, although that may not be a viable strategy for every company and every product.

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<sup>63</sup> Lawrence J. Korb and Katherine Blakeley, “Defense Budget Déjà vu,” *Center for American Progress*, February 9, 2015.

## V. Company and Product Performance

Company selection is based on the amount of revenue they receive from the United States government.<sup>64</sup> Although an individual company may move up or down within the top-six overall ranking from year to year, the companies that comprise the top six remain the same: Lockheed Martin, Boeing, BAE Systems, Raytheon, General Dynamics, and Northrop Grumman.

The purpose of this company- and product-specific analysis is to highlight the public statements by each company regarding future international sales growth, the past success of the companies selling abroad, and the successes and failures that each company has experienced. This analysis will show the multitude of difficulties that these defense companies face if they actually plan to make up for lost U.S. sales through international sales in any meaningful way. The selection of individual products is meant to highlight key issues that defense companies face in international markets.

### **LOCKHEED MARTIN**

Lockheed Martin, the world's largest defense contractor by revenue, earns approximately 20% of its revenue from international sales and plans to increase that number to 25%.<sup>65</sup> In official documents such as annual financial statements and in executives' statements to the media, Lockheed Martin has strongly made the case that it needs to increase international business as a percentage of total sales. The reasons stated for this increase are to make up for lost U.S. revenue, to mitigate some risk of future budget cuts, to keep old and profitable production lines open, and to lower the per unit cost of new technologies, especially the F-35.<sup>66</sup> Looking at

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<sup>64</sup> SIPRI Arms Industry Database, retrieved December 2014.

<sup>65</sup> Lockheed Martin 2014 10K.

<sup>66</sup> For examples see: Lockheed Martin 2014 10K, 25-28, and Christian Davenport, "Lockheed Martin Eyes International Sales, Increased R&D," *The Washington Post*, June 9, 2014, and David Lerman and Robert Wall, "U.S. Defense Contractors Focus on Foreign Buyers," *Bloomberg*, November 14, 2013,

the company's revenue numbers by geography on both a total and percentage basis, the numbers appear to follow that same storyline. For example, 2014 total international sales did rise to their highest level while U.S. sales continued to slide.

Lockheed Martin has done more to show its seriousness towards increasing international sales than just release press statements. In a sign of organizational commitment, Lockheed Martin launched an international division in 2013.<sup>67</sup> While this shows tangible evidence of the company's increased international focus, the overall profitability of its international sales is questionable. This is due to the drastically different types of products that Lockheed Martin sells abroad and the countries to which the company sells.

In the past, the company has relied on its export-only sales of F-16 and C-130J aircraft from its Aeronautics division and various products under its Missiles and Fire Control division.<sup>68</sup> Particularly for the aircraft, these products have fully-amortized fixed costs and are therefore very different from the F-35, a product that needs substantially more sales to bring down the per unit cost and increase profitability. The following two sections will analyze the international sales performance and potential for the F-16 and the F-35. The purpose of this analysis is to highlight the diverse difficulties that Lockheed Martin faces when selling two very different products, both internally and on a customer-by-customer basis.

## **F-16**

The U.S. military has not purchased any new F-16's for over a decade, although it continues to upgrade, maintain, and operate previously purchased planes. While there may be follow-on service or parts contracts to support the life cycle of the already purchased systems,

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<http://www.bloomberg.com/bw/articles/2013-11-14/2014-outlook-u-dot-s-dot-defense-contractors-focus-on-foreign-buyers>

<sup>67</sup> Carola Hoyos, "Lockheed Launches Overseas Division," *Financial Times*, July 1, 2013, <http://www.ft.com/intl/cms/s/0/8e351e10-e260-11e2-a7fa-00144feabdc0.html>

<sup>68</sup> Lockheed Martin 2014 10K.

the loss of a U.S. contract often spells the end of the production. Nevertheless, the international demand for the F-16 has remained intact, with backorders through 2017.<sup>69</sup> Continued production and sales of the aircraft have relied solely on its continued international popularity. Lockheed Martin has sold over 4,500 total F-16's worldwide to 26 countries, 1,445 of which were sold to the U.S.<sup>70</sup> Although production has slowed to roughly one plane per month from a production high of approximately 30 planes per month in 1987, executives at Lockheed Martin are planning for production up to 2020.<sup>71</sup>

As with many defense technologies, business for the F-16 also means business for others of the top-six. For example, Northrop Grumman has built the "AESA" radar units for the F-16. While Lockheed Martin is the obvious public winner each time a F-16 is built and delivered, every subcontractor that is part of production reaps the benefits. If and when production of the F-16 stops, the same holds true but in reverse. While there will continue to be a market for upgrades, parts, and spares, much of the subcontracting work will disappear.

There is the possibility that some "straddler" countries or countries with increasing wealth will begin to or continue to purchase the advanced but not quite cutting edge F-16. Not all countries are as lucky as Brazil in their relative geographic safety. For example, some Southeast Asian countries already operating the F-16 may continue purchases to maintain interoperability with the United States military and provide at least some show of force against substantially stronger neighbors such as China.

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<sup>69</sup> Lockheed Martin 2014 10K.

<sup>70</sup> David Lerman and Robert Wall, "U.S. Defense Contractors Focus on Foreign Buyers," *Bloomberg*, November 14, 2013.

<sup>71</sup> Andrea Shalal-Esa, "Lockheed Sees F-16 Fighter Jet Production Continuing Through 2020," *Reuters*, December 14, 2013, <http://www.reuters.com/article/2013/12/14/lockheed-f-idUSL2N0JT03T20131214>

## **F-35**

The F-35 already accounts for 16% of total company net sales and 50% of Aeronautics sales.<sup>72</sup> Getting the F-35 out of the development stage and into full production is paramount to Lockheed's future success. The U.S. plans to buy 2,400 of the aircraft, with the U.K., Norway, Netherlands, Israel, Australia, Turkey, and Japan expect to purchase around 600 more. If this volume does not materialize, either due to continued development and production problems or reductions in procurement budgets for the aircraft, the long-term profitability of the plane is questionable. The problem that Lockheed Martin faces is the high price-point of the aircraft. All of the countries that have signed on to buy the aircraft are Western European countries, NATO allies, or countries that enjoy strong military relationships with the United States. While countries such as Brazil and India have the budget to purchase the planes, it seems unlikely they would do so, certainly not anytime soon, based on their offset requirements, historical procurement strategy, and restrictions imposed by the U.S. government.

Balancing when to stop production F-16 production in favor of possible F-35 sales is a difficult decision. The obvious time would be when demand stops, but that does not seem imminent. However, each sale of a new F-16 may, in some cases, cannibalize the sale of the F-35. Countries at the upper end of the straddling acquisitions strategy between quantity and quality may be reluctant to go with the costly F-35, if the tried, true, and relatively affordable F-16 is still available.

## **BOEING**

Boeing is unique among the top-six defense companies in that the majority of its business comes from non-defense sales. Approximately 34% of Boeing's revenue comes from its defense divisions, with almost 15% of total revenue coming from its military aircraft division

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<sup>72</sup> Lockheed Martin 2013 10K.

specifically.<sup>73</sup> The large commercial business makes Boeing's fate less tied to the U.S. budget process, but the threat of sequestration remains serious for Boeing. Although total revenue at Boeing has increased every year for the past three years, military aircraft sales have declined since 2012, with a \$1.77 billion decrease in 2014. Boeing does not provide data that separates domestic and international sales by division, but executives at the company have made strong statements in both official documents and through the press regarding their desire to grow international sales. The executives commonly cite India, Brazil, South Korea, and Middle Eastern countries – specifically Saudi Arabia – as areas for growth.<sup>74</sup> Boeing already has strong relationships with some of these countries. Saudi Arabia, for example, has long been a high quantity buyer of the F-15. Other relationships, however, such as with South Korea, have become tenuous, as the country is now looking for a fighter with stealth capabilities, such as Lockheed Martin's F-35, instead of the F-15.<sup>75</sup> All of the countries mentioned have unique financial resources, offset requirements, procurement strategies, and regulations to work through. The following section on the F-15 will provide more detail about some of these competitions and will again highlight the international market as highly diverse, fragmented, and not easily accessible.

## **F-15**

The Boeing F-15, like the Lockheed Martin F-16, is a popular aircraft in the U.S. and abroad. The U.S. has purchased 1,600 of the aircraft over the past 30 years, and the list of international clients includes Japan, Saudi Arabia, Singapore, Israel, and South Korea. Again

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<sup>73</sup> "Boeing Company Profile." Capital IQ. March 3, 2015. Standard & Poor's.

<sup>74</sup> "Boeing will Increasingly Rely on International Defense Sales," *NASDAQ.com*, February 15, 2013, <http://www.nasdaq.com/article/boeing-will-increasingly-rely-on-international-defense-sales-cm218255>

<sup>75</sup> Colin Clark, "South Korea Dumps Boeing F-15 for Stealth; F-35 Pacific Sweep Likely," *BreakingDefense.com*, September 24, 2013, <http://breakingdefense.com/2013/09/korea-dumps-boeing-f-15-for-stealth-f-35-pacific-sweep-likely/>.

highlighting the interconnectedness of the defense industry, especially at the levels of the most advanced technology, the F-15 includes major components produced by Lockheed Martin and Raytheon. While Lockheed would surely have preferred to sell F-16s, every F-15 sale still represents business for Lockheed, along with Raytheon, too, meaning at least three of the top-six defense companies from every Boeing sale.

The F-15 provides an excellent example of the difficulties in expanding international sales, especially the cases of Saudi Arabia and South Korea. Over the past few years, it is sales to Saudi Arabia, and the loss of sales to South Korea, that have made the headlines for Boeing. The bulk order of F-15's by Saudi Arabia certainly qualifies as a "home-run" for Boeing, but also includes costly offsets that reduce the overall profitability. South Korea shows the difficulty of winning business in the competitive defense market, even before considering the regulatory hurdles or offset costs.

Saudi Arabia, flush with oil revenues, does not have the same purchasing constraints that other countries do. In 2010, Saudi Arabia purchased 84 new F-15's for approximately \$30 billion.<sup>76</sup> The deal also included refurbishing 70 previously delivered aircraft, bringing the total value of the contract to approximately \$60 billion.<sup>77</sup> Like Lockheed Martin's F-16, the F-15 production line is well established and likely has fully amortized fixed costs, making such a deal highly profitable. Production of the planes will continue until 2019, with the upgrades to the older planes starting in 2016.<sup>78</sup>

That does not mean, however, that Boeing is free from costly offsets when doing business in Saudi Arabia. More flexible than India or Brazil, Saudi Arabia has reaped the benefits of

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<sup>76</sup> Chris Pocock, "Huge Saudi F-15 Sale Confirmed," *AINOnline.com*, January 6, 2012.

<sup>77</sup> "Saudi Arabia: Increased Security: Defence Offsets Programme Helps to Create Local Benefits," Oxford Business Group.

<sup>78</sup> Bill Carey, "Boeing Presents First F-15SA of Saudi Arms Package," *AINOnline*, May 3, 2013, <http://www.ainonline.com/aviation-news/defense/2012-01-06/huge-saudi-f-15-sale-confirmed>

Boeing-funded investments in the country's defense industrial sector and in non-defense areas such as the Prince Salman Center for Disability Research, the Prince Fahad bin Salman Charity Association for Renal Patients Care, and various other medical, social, and education programs.<sup>79</sup> Saudi Arabia requires the total value of the offsets for defense purchases to equal 35% of the contract value, a hefty cost to pay just to win business, albeit substantially less than many other countries. The price of the offset has proven to be palatable to Boeing, especially given Saudi Arabia's relative flexibility in terms of how the offset is paid. Whether Boeing can successfully navigate India's more burdensome requirements is currently playing out via the ongoing attempts to sell AH-64E Apache and CH-47F Chinook helicopters.<sup>80</sup> This country-by-country struggle shows how difficult it will be to grow international revenue in a meaningful way if U.S. defense budgets remain stagnant or decline.

While Boeing found success with its F-15 in Saudi Arabia, it also fought for – but eventually lost – South Korea as a buyer. Boeing won the original competition in 2013 for the South Korean contract, with the F-35 originally judged to be too pricey, and the Eurofighter Typhoon consortium having too many bidding and contractual irregularities.<sup>81</sup> Despite this initial victory, however, South Korea reopened the bidding, with the F-35 winning the over \$7 billion contract.<sup>82</sup> The South Korean Air Force's preference for the F-35 is thought to be the basis for reopening the bidding.<sup>83</sup> This was more than just a contract loss for Boeing. If it had won the

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<sup>79</sup> "Boeing in the Kingdom of Saudi Arabia Backgrounder," Boeing, revised February 2015.

<sup>80</sup> Vivek Raghuvanshi, "India May Sign Helo Deal by Boeing Deadline," *DefenseNews.com*, February 19, 2015, <http://www.defensenews.com/story/defense/air-space/air-force/2015/02/19/india-boeing-helicopter-apache-chinook-russia-funding-deadline-march-31/23622157/>

<sup>81</sup> Bradley Perrett, Bill Sweetman, and Amy Butler, "South Korean Fighter Order: AF Backs F-35," *AviationWeek.com*, August 26, 2013, <http://aviationweek.com/awin/south-korean-fighter-order-af-backs-f-35>

<sup>82</sup> "South Korea to Sign Deal this Month to Buy 40 F-35 jets for \$7billion: sources," *Reuters*, September 24, 2014, <http://www.reuters.com/article/2014/09/24/us-southkorea-airforce-orders-idUSKCN0HJ0P620140924>

<sup>83</sup> Bradley Perrett, Bill Sweetman, and Amy Butler, "South Korean Fighter Order: AF Backs F-35."

bid, it would have been possible for the company to confidently keep production of the F-15 open into the 2020's, with the possibility of significant upgrades and redesign.<sup>84</sup>

The Saudi Arabia and South Korea examples highlight the difficulties that Boeing will face moving forward in capturing the high-end fighter market. Boeing cannot compete on price like Saab with its Gripen or cheaper Russian models, possibly losing Boeing the large-budget bargain-hunters such as Brazil. Likewise, they cannot compete on the cutting edge against the F-35, losing Boeing the large-budget high-end buyers such as South Korea. There are numerous other factors aside from price and quality, of course, such as politics or the long-term strategic plans of countries to combat regional threats, and Boeing does have a diverse set of other technologies with which to grow international revenue. But it seems that the F-15 will struggle to play a role into the future.

## **BAE SYSTEMS**

Public statements and documents from executives at BAE Systems are far less optimistic about the possibility of making up for lost U.S. revenue in the international market. For example, Linda Hudson, CEO of BAE's U.S. operations, expected BAE sales to be "either declining to maybe flat," and said that "it is hard in my mind to see international sales completely offsetting declines in U.S. defense spending."<sup>85</sup> Her reasoning was that the U.S. market is so large that it is difficult to make up for lost budget when "everyone is fighting for the same slice of the international pie."<sup>86</sup> Although BAE is the only non-American-owned company amongst the top-six defense companies, its biggest customer is the United States, at 40% of revenues. The next two biggest clients are the United Kingdom at 20% of revenue and Saudi Arabia at 20% of

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<sup>84</sup> Bradley Perrett, Bill Sweetman, and Amy Butler, "South Korean Fighter Order: AF Backs F-35."

<sup>85</sup> Alwyn Scott, "BAE Systems U.S. CEO says Expect Declining of Flat Sales," *Reuters*, September 4, 2013, <http://www.reuters.com/article/2013/09/04/us-aerospace-defense-idUSBRE9820Y820130904>

<sup>86</sup> Alwyn Scott, "BAE Systems U.S. CEO says Expect Declining of Flat Sales".

revenue. Numerous countries buying relatively small amounts make up the final 20% of BAE's business. While the other companies on the list derive the vast majority of their revenues from U.S. sales, BAE is much more customer diversified. The M109 artillery line is one of BAE Systems' most successful lines internationally.

### **M109 Self-Propelled Artillery**

The M109, originally developed in the 1960's, has a long history of upgrades and new variant development, with the Paladin as one of the most recent upgrades. This long history and ability to upgrade the product has provided BAE with a second revenue stream. In fact, BAE is already produced a newer variant, the M109A7.<sup>87</sup> As previously discussed, however, not all countries need the latest technology to meet their national security needs. Additionally, changes in military strategy away from heavy armored ground units and towards more flexibility and faster deployment times add an additional hurdle to sales of armored vehicles and artillery.

Although full-rate production of the Paladin stopped in 2009, the business of upgrades is where the M109 line shines. For example, in 2011, BAE won a \$15.8 million contract to upgrade Chile's older M109A5's.<sup>88</sup> With 20 countries worldwide using the older models of the M109, BAE has plenty of potential customers.<sup>89</sup> There are many potential difficulties with winning this relatively low-dollar business. While the high number of potential customers is a positive, it also requires more staff and cost to actively pursue the upgrade business. The upgrade business does provide BAE with solid revenue, but it seems unlikely that it will prove to be a difference maker if the U.S. defense budget continues to remain flat or, even worse, declines.

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<sup>87</sup> M109A7, *BAESystems.com*, Products Page, [http://www.baesystems.com/product/BAES\\_020013/m109a7](http://www.baesystems.com/product/BAES_020013/m109a7)

<sup>88</sup> Upgrading Howitzers for Chile, *BAESystems.com*, Newsroom Page.

<sup>89</sup> "Have Guns, Will Upgrade: The M109A7 Paladin PIM Self-Propelled Howitzer," *DefenseIndustryDaily.com*, November 2, 2014, <http://www.defenseindustrydaily.com/have-guns-will-upgrade-the-m109a6-paladin-pim-partnership-04039/>, accessed April 22, 2015.

More worrisome for BAE is the fight to keep open the York, Pennsylvania, facility where it manufactures and upgrades both the M109 and the Bradley Fighting Vehicle. Changes in U.S. military strategy towards a lighter and more flexible fighting force mean a move away from relatively slow and heavy systems such as the Bradley, M109 artillery, and M1 tank.<sup>90</sup> In addition to taking away York's biggest customer, this shift also sends a signal to foreign customers that the usefulness of such technologies may be waning. In fact, BAE did not build any new M109s or Bradleys in 2013.<sup>91</sup> Iraq and Saudi Arabia are considering ordering new Bradleys, which would keep the York facility operating. Unfortunately for BAE, the timeline for those orders extends into 2016, which may be too far in the future to ensure that the product line survives.<sup>92</sup>

The M109 highlights the importance of the United States as more than just a large buyer. Changes in U.S. procurement, whether due to budget constraints or changes in military strategy, influence the entire global defense market. A loss of U.S. spending may signal to potential buyers that the technology is antiquated and undesirable. Without sales to the United States, and with lowered potential international sales, it would be difficult to justify keeping the production line open.

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<sup>90</sup> Joe Gould, "US Army Talks Tanks as Russia's Hit Ukraine," *Defense News*, February 19, 2015, <http://www.defensenews.com/story/defense/land/army/2015/02/19/russia-armor-tank-ukraine-europe-poland-baltics-abrams-bradley/23555365/>, accessed April 22, 2015.

<sup>91</sup> Sydney Freedberg Jr., "BAE Storms Hill For Bradley Funding to Keep Penn. Plant Alive," *Breaking Defense*, March 14, 2013, <http://breakingdefense.com/2013/03/bae-storms-hill-for-bradley-funding-to-keep-penn-plant-alive/>, accessed April 22, 2015.

<sup>92</sup> Valerie Insinna, "BAE Avoids Plant Shut Down...For Now," *National Defense Magazine*, October 2013, <http://www.nationaldefensemagazine.org/archive/2013/October/Pages/BAEAvoidsPlantShutDown%E2%80%A6Fo%rNow.aspx>, accessed April 22, 2015.

## RAYTHEON

Like the other defense companies, Raytheon also cites the need to grow internationally in order to drive revenue.<sup>93</sup> Revenue from U.S. sales has declined every year since 2010, while revenues from international sales have increased every year since 2003. In both cases, the decreases or increases in revenue are slow and steady, not the sudden spikes one might expect from sequestration or a strong change in strategy. This does not mean that international sales growth is not legitimately part of Raytheon's growth strategy, only that increasing those revenue numbers as any sort of stopgap measure to mitigate U.S. budget cuts did not happen.

International sales as a percentage of overall sales have increased from 27% in 2013 to 30% in 2014. Raytheon also believes that international defense budgets "have the potential to grow and to do so at a faster rate than the U.S. defense budget."<sup>94</sup> The company has also publicly added more specifics in its strategies to accomplish the goal of increasing international sales. For example, CFO Dave Wajsgas has said that Raytheon is working to become "more involved in procurement planning with some governments, just as it does with the Pentagon."<sup>95</sup> Similar to BAE, however, Raytheon is tempered in their approach to the international market.<sup>96</sup> The following sections on the Patriot Missile System and the Three-Dimensional Expeditionary Long-Range Radar (3DELRR) will highlight some of Raytheon's successes and failures in the international market.

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<sup>93</sup> Peter Felstead, "Farnborough 2014: Raytheon Targets Domestic Hot Spots While Pursuing Increased International Sales," *Janes.com*, July 17, 2014, <http://www.janes.com/article/40941/farnborough-2014-raytheon-targets-domestic-hot-spots-while-pursuing-increased-international-sales>

<sup>94</sup> Raytheon 2013 10K, page 30.

<sup>95</sup> Doug Cameron, "Raytheon Looks to Growth as Books Rise," *The Wall Street Journal*, October 23, 2014.

<sup>96</sup> Katie Kriz, "Raytheon to Focus on International Market as US Government Business Declines," *SatelliteToday.com*, January 31, 2014.

## **Patriot Missile**

The Patriot Missile System is a surface-to-air missile defense system. Thirteen countries, five of which are NATO allies, currently operate the Patriot.<sup>97</sup> Former CEO William Swanson has described the product as a “never ending opportunity” due to the opportunity to upgrade old systems with each major improvement to the system.<sup>98</sup> In addition to continued sales of new systems, this upgradability has pushed potential future revenues into the billions of dollars. As more countries adopt the technology, it also drives down the per-unit cost. The choice to adopt the Patriot was made all the easier once the U.S. Army and then international partner Germany pulled funding for Lockheed Martins’ next-generation MEADS system, a system designed to replaced the Patriot.<sup>99</sup>

These two aspects of Raytheon’s success – its ability to create multiple strong revenue streams from a single product and an outside decision by the U.S. military and partner countries to discontinue a future rival – highlight two important aspects of success in the international market. Overseas deals are difficult to win, so designing a system that has long-term revenue potential beyond the initial sale is key. More than just maintenance or parts, the ability to upgrade entire systems with obvious and proven benefits to the purchasing country is ideal. The idea to design upgradable systems is certainly not unique to Raytheon, but Raytheon has significantly benefitted from this strategy. Further, the impact of investment and procurement decisions by the U.S. shows the power of the U.S. market even in the international markets in which companies look to expand, because U.S. spending goes a long way to define the competitive environment.

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<sup>97</sup> “Global Patriot Solutions,” Raytheon.com, Products Page.

<sup>98</sup> Andrea Shalal-Esa, “Raytheon Sees ‘Never-Ending Opportunity’ in Patriot Missile System,” *Reuters*, August 5, 2013, <http://www.reuters.com/article/2013/08/05/us-raytheon-patriot-idUSBRE9740QZ20130805>

<sup>99</sup> Andrea Shalal-Esa, “Raytheon Sees ‘Never-Ending Opportunity’ in Patriot Missile System.”

### **3DELRR**

The development of the 3DELRR is also an example of the impact of U.S. decision making, but from a positive and collaborative rather than the restrictive relationships described earlier in this paper. Following the Pentagon's "Defense Exportability Features Initiative," part of the Pentagon's "Better Buying Power 2.0," Raytheon is developing 3DELRR to include features and components that would pass the restrictions of ITAR.<sup>100</sup> As a result, Raytheon should have an easier time selling the radar to most other markets, allowing greater initial sales and possibly driving down the per-unit cost. This development, however, has hit a roadblock as Lockheed Martin and Northrop Grumman have protested the U.S. Air Force's award of the contract to Raytheon.<sup>101</sup>

This mix of government cooperation and intra-industry competition highlights unique difficulties defense companies must face. Not only must defense companies pass the strict bureaucratic gauntlet of the U.S. government, but they must also compete against private sector rivals that sometimes use the same bureaucracy to slow the process as much as possible when competitive bids do not go their way.

### **GENERAL DYNAMICS**

Like Boeing, General Dynamics derives a substantial portion of its business from commercial customers, 31% of total revenues.<sup>102</sup> Most of this revenue comes from its business aircraft product line.<sup>103</sup> Unlike Boeing, however, the majority of General Dynamics' revenue comes from its defense business, with 62% of revenues coming from the U.S. market and 7%

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<sup>100</sup> Aaron Mehta, "3DELRR Illustrates New Export Reality," *DefenseNews.com*, October 14, 2014, <http://archive.defensenews.com/article/20141014/DEFREG02/310140032/3DELRR-Illustrates-New-Export-Reality>

<sup>101</sup> Andrea Shalal, "Update 2-U.S. Air Force to Re-Evaluate Bids in Radar Contract," *Reuters*, January 21, 2015, <http://www.reuters.com/article/2015/01/22/usa-pentagon-raytheon-idUSL1N0V025820150122>

<sup>102</sup> General Dynamics 2013 10K

<sup>103</sup> General Dynamics 2013 10K.

from the international market.<sup>104</sup> With such a large percentage of the company's business coming from commercial jet customers as compared to international defense customers, official company documents focus on expanding the former rather than the latter.<sup>105</sup> This makes the General Dynamics case particularly interesting to follow when compared to other defense companies that have put strong support behind international defense sales growth. If General Dynamics can grow or maintain its business at the same rate as the other companies, it will suggest that international defense sales growth may not depend on specific company strategy decisions; instead, it may depend more on expanding international budgets that mean that countries can simply buy more stuff.

General Dynamics has seen its overall revenue decline by almost \$2 billion since 2011.<sup>106</sup> For its Combat Systems division specifically, which manufactures the M1 Abrams tank, revenues have dropped by over \$3 billion during that same time-period.<sup>107</sup> General Dynamics CEO Phebe Novakovic specifically pointed to the actual cuts and the perception of potential budget shortages due to sequestration as the reason for revenue declines in the Combat Systems division.<sup>108</sup> Conversely, General Dynamics Electric Boat division is set for significant growth, with Congress authorizing billions in funding for new submarine construction.<sup>109</sup>

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<sup>104</sup> "General Dynamics Company Profile." Capital IQ. March 3, 2015. Standard & Poor's.

<sup>105</sup> General Dynamics 2013 10K

<sup>106</sup> "General Dynamics Company Profile." Capital IQ. March 3, 2015. Standard & Poor's.

<sup>107</sup> "General Dynamics Company Profile." Capital IQ.

<sup>108</sup> Marjorie Censer, "General Dynamics Sees Flat Sales Despite Sequestration and Shutdown," *The Washington Post*, January 22, 2014, [http://www.washingtonpost.com/business/capitalbusiness/general-dynamics-sees-flat-sales-despite-sequestration-and-shutdown/2014/01/22/97084f4a-837c-11e3-bbe5-6a2a3141e3a9\\_story.html](http://www.washingtonpost.com/business/capitalbusiness/general-dynamics-sees-flat-sales-despite-sequestration-and-shutdown/2014/01/22/97084f4a-837c-11e3-bbe5-6a2a3141e3a9_story.html)

<sup>109</sup> Christopher Cavas, "Bow Wave of Subs Rolling Through Yards," *Defense News*, April 13, 2015, <http://www.defensenews.com/story/defense/show-daily/sea-air-space/2015/04/12/submarine-virginia-class-ohio-class-replacement/25537589/>

## **M1 Abrams Tank**

The M1 Abrams Tank is the main battle tank of the U.S., Egypt, Kuwait, Saudi Arabia, Australia, and Iraq.<sup>110</sup> The tanks and the Lima, Ohio, facility where General Dynamics produces them were at the forefront of the budget debate in 2012. The facility is owned by the U.S. government but operated by General Dynamics. The U.S. Army wanted to temporarily stop funding the facility to save money, because it felt that it already had enough tanks. However, U.S. politicians, especially those from Ohio, wanted to keep production open, citing the potential lost jobs in their home state, the difficulties and costs of “temporarily” closing a plant, and ambiguous references to overall national security. Instead of closing the plant, Congress approved \$255 million to upgrade older tanks in the facility.<sup>111</sup> If the plant were to lose Army funding, the only way it could stay in operation without congressional help would be through ramped up international sales.<sup>112</sup> However, without the help from Congress, increasing unit costs due to the lack of U.S. purchases would lower the international competitiveness of the M1.

This example shows the repercussions of U.S. budget and procurement decisions on a defense company’s ability to compete domestically and internationally. The M1 has been and could continue to be a strong export product for General Dynamics, but the uncertainty associated with funding decisions specifically related to the Lima plant, and the defense budget as a whole, make planning difficult. As with BAE’s M109, the circularity issue persists of needing U.S. funding to continue operations to build and sell the M1 abroad, while also needing international sales to keep per unit costs down to continue U.S funding.

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<sup>110</sup> “Abrams Family,” GeneralDynamics.com, Products Page.

<sup>111</sup> Brian Bull, “Plant Pleads to Stay Afloat, but Army Says ‘No Tanks’,” *NPR*, July 25, 2012.

<sup>112</sup> Colin Clark, “Push to Keep Lima Tank Plant Gathers Steam Before HASC Markup,” *BreakingDefense.com*, May 21, 2013, <http://breakingdefense.com/documents/push-to-keep-lima-tank-plant-gathers-steam-before-hasc-markup/>.

## **NORTHROP GRUMMAN**

Northrop Grumman's international defense sales grew from 6% of total sales in 2006 to approximately 13% of total sales in 2014.<sup>113</sup> The company expects international sales to rise to 15% of total sales in 2015.<sup>114</sup> No one product accounted for more than 10% of international sales, making Northrop Grumman's sales profile unlike other defense companies like Lockheed Martin that rely on a few products for a large share of international sales.<sup>115</sup> Northrop Grumman CEO Wes Bush cites the "mindless" cuts from sequestration and the future budget uncertainty as reasons to emphasize expanding globally.<sup>116</sup> Although international sales represent a smaller percentage of total sales as compared to some of Northrop Grumman's competitors, the company sees pent-up demand for their products, making it more reasonable to ramp up sales quickly.<sup>117</sup> Moving forward, CEO Bush singles out "increased demand for unmanned and manned aircraft" as the driver of that expansion.<sup>118</sup> The following section will analyze the performance of Northrop Grumman's premier unmanned aircraft, the Global Hawk, on the international market.

### **Global Hawk**

The Global Hawk is a high-altitude endurance unmanned aerial vehicle that was first deployed overseas in the months immediately following the September 11, 2001 terrorist attacks. Like other technologies in this report, the Global Hawk has also faced domestic difficulties from

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<sup>113</sup> "Northrop Grumman Company Profile." Capital IQ. March 3, 2015. Standard & Poor's

<sup>114</sup> Sabarika Jaisinghani, "Update 2- Northrop Grumman Expects International Markets to Drive Growth," *Reuters*, January 29, 2015, <http://www.reuters.com/article/2015/01/29/northrop-grumman-results-idUSL4N0V85XA20150129>

<sup>115</sup> Northrop Grumman 2013 10K and Lockheed Martin 2013 10K.

<sup>116</sup> Juliet Van Wagenen, "Northrop Grumman CEO Sees Sequestration Squash Domestic Growth as International Sales Flourish," *AviationToday.com*, February 4, 2015, [http://www.aviationtoday.com/av/military/Northrop-Grumman-CEO-Sees-Sequestration-Squash-Domestic-Growth-as-International-Sales-Flourish\\_84116.html#.VQxbHmTF\\_38](http://www.aviationtoday.com/av/military/Northrop-Grumman-CEO-Sees-Sequestration-Squash-Domestic-Growth-as-International-Sales-Flourish_84116.html#.VQxbHmTF_38)

<sup>117</sup> Richard W. Walker, "Northrop Targets International Markets for Future Opportunities," *WashingtonTechnology.com*, June 15, 2014, <http://washingtontechnology.com/articles/2014/06/15/top-100-northrop.aspx>.

<sup>118</sup> Richard W. Walker, "Northrop Targets International Markets for Future Opportunities."

U.S. spending decisions. The U.S. Air Force first planned to end procurement of the project in favor of the U-2 manned aircraft, which has lower operational costs.<sup>119</sup> Then, the U.S. Air Force moved to retire the U-2 in 2014 in favor of the Global Hawk but met with resistance from Congress. The new retirement date for the U-2 is now 2019.<sup>120</sup> The planned transition gives the Global Hawk program more certainty for a domestic market moving forward, although not as much as Northrop Grumman would like.

Internationally, Germany, Japan, South Korea, Australia and India have shown interest in the product.<sup>121</sup> To date, only Germany has procured the Global Hawk.<sup>122</sup> Of these countries, Japan, South Korea and Australia all face similar maritime security concerns; Japan and Australia especially need to patrol vast areas of open ocean.<sup>123</sup> They all also use aging patrol craft, which Northrop Grumman would prefer to replace with Global Hawk. To do so, however, would require changes to U.S. and individual country regulations. For example, the Missile Technology Control Regime, which South Korea joined in 2001, limits the payloads of South Korean drones, excluding the Global Hawk from South Korean procurement.<sup>124</sup> The per-unit price is also a problem for many countries. Although the aircraft itself would sell for approximately \$40 million dollars, once it is fitted with the needed high-end sensors and other equipment, the price jumps to approximately \$150 million.<sup>125</sup> However, the high price point

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<sup>119</sup> Aaron Mehta, "USAF Looks to Global Hawk Upgrades," *DefenseNews.com*, March 7, 2015, <http://www.defensenews.com/story/defense/air-space/isr/2015/03/07/global-hawk-looks-to-future-upgrades/24120821/>

<sup>120</sup> Aaron Mehta, "USAF Looks to Global Hawk Upgrades."

<sup>121</sup> Juliet Van Wagenen, "Northrop Grumman CEO Sees Sequestration Squash Domestic Growth as International Sales Flourish."

<sup>122</sup> Sydney Freedberg Jr., "Military 'Aggressively Working' to Ease Drone Sales Abroad," *BreakingDefense.com*, August 9, 2012, <http://breakingdefense.com/2012/08/military-aggressively-working-to-ease-drone-sales-abroad/>

<sup>123</sup> Sydney Freedberg Jr., "Military 'Aggressively Working' to Ease Drone Sales Abroad."

<sup>124</sup> "US Will Sell Global Hawks- Will South Korea Buy," *DefenseIndustryDaily.com*, November 3, 2013., <http://www.defenseindustrydaily.com/report-us-agrees-to-sell-global-hawks-to-south-korea-05032/>

<sup>125</sup> "US Will Sell Global Hawks- Will South Korea Buy," *DefenseIndustryDaily.com*.

means that Northrop Grumman only needs to sell a few of the vehicles to quickly ramp up international revenue.

The Global Hawk case highlights the confluence of both regulatory and financial hurdles that companies face when selling abroad. Whether Northrop Grumman is able to overcome these hurdles and whether there is as much pent-up demand as the company predicts will significantly impact the company's ability to expand its international sales.

## **VI. Conclusion**

Companies that are looking to quickly ramp-up international sales to make up for U.S. budget decreases should moderate their expectations. The reasons for this moderation are numerous. First, the international market is fragmented in terms of technology needs and ability to pay. Not all countries need, want, or can afford a given company's product. This further narrows the international market, which is already a fraction of the size of the U.S. market when taken on a country-by-country basis. Fragmentation may help a company focus its sales efforts, but it also limits the total opportunity.

Second, it is exceptionally difficult to navigate foreign sales due to bureaucratic hurdles both to export from the United States and to import into foreign countries. U.S. policy makers have made important recommendations to improve the exportability of U.S. products, including key provisions of Better Buying Power 2.0. While this will certainly help some companies, others such as Lockheed Martin and its F-35 face continuing constraints. Bringing down the per-unit costs through increased volume is key to both sellers and buyers. International sales seems to be part of the solution, but not as much as some might hope.

Finally, U.S. companies trying to sell abroad will be met with stiff competition from U.S. rivals as well foreign producers in Europe, Russia, and China – not to mention domestic producers in key foreign markets like India. While some products exist without peers, countries buying weapons that are less than “cutting-edge” have plenty of options of choose from. This forces companies to also compete on price, possibly hurting margins. These low-margin sales will help drive top-line revenue but may not do much to help the companies' overall profitability.

Although international sales are and will continue to be important to the overall health of the top defense companies, the future of the U.S. defense budget is far more important. Static or

shrinking budgets will force companies to not only drive international revenue as fast as possible but also to make deeper cuts to drive down costs. The uncertainty of the budget situation further makes it difficult for the companies to plan, organize, and execute.

## Bibliography

- “Abrams Family,” GeneralDynamics.com, Products Page.
- Bitzinger, Richard. “Introduction: Challenges Facing the Global Arms Industry in the 21<sup>st</sup> Century.” *The Modern Defense Industry*, ed. Richard Bitzinger. Santa Barbara: Praeger Security International/ABC-CLIO, 2009.
- Bitzinger, Richard A. “The Global Arms Trade: “Hyundaisation” Threat from New Suppliers.” *RSIS Commentary*, No. 098 – April 23, 2015.
- "Boeing Company Profile." Capital IQ. March 3, 2015. Standard & Poor's.
- “Boeing in the Kingdom of Saudi Arabia Backgrounder,” Boeing, revised February 2015.
- “Boeing will Increasingly Rely on International Defense Sales,” *NASDAQ.com*, February 15, 2013, <http://www.nasdaq.com/article/boeing-will-increasingly-rely-on-international-defense-sales-cm218255>
- Boutin, J.D. Kenneth. “Emerging Defense Industries: Prospects and Implications.” *The Modern Defense Industry*. ed. Richard Bitzinger. Santa Barbara: Praeger Security International/ABC-CLIO, 2009.
- Brazilian Defense Industry to 2017, The. *PR Newswire*, January 22, 2013.
- Brazilian Defense Sector, The - Market Opportunity and Entry Strategy, Analyses and Forecasts to 2015 - Market Intelligence Report - ICD Research – June 2012.
- Bull, Brian, “Plant Pleads to Stay Afloat, but Army Says ‘No Tanks’,” *NPR*, July 25, 2012, accessed April 24, 2015, <http://www.npr.org/2012/07/25/157256332/plant-pleads-to-stay-afloat-but-army-says-no-tanks>.
- Bureau of Industry and Security, U.S. Department of Commerce “SIES FAQ,” <http://www.bis.doc.gov/index.php/2011-09-20-13-26-57?view=category&id=55#subcat56>.
- Cameron, Doug. “Raytheon Looks to Growth as Books Rise.” *The Wall Street Journal*, October 23, 2014. <http://www.wsj.com/articles/raytheon-profit-rises-5-as-orders-continue-1414062302>.
- Carey, Bill. “Boeing Presents First F-15SA of Saudi Arms Package.” *AINOnline*, May 3, 2013, <http://www.ainonline.com/aviation-news/defense/2012-01-06/huge-saudi-f-15-sale-confirmed>.

- Cavas, Christopher. "Bow Wave of Subs Rolling Through Yards." *Defense News*. April 13, 2015, <http://www.defensenews.com/story/defense/show-daily/sea-air-space/2015/04/12/submarine-virginia-class-ohio-class-replacement/25537589/>.
- Censer, Marjorie. "General Dynamics Sees Flat Sales Despite Sequestration and Shutdown." *The Washington Post*, January 22, 2014, [http://www.washingtonpost.com/business/capitalbusiness/general-dynamics-sees-flat-sales-despite-sequestration-and-shutdown/2014/01/22/97084f4a-837c-11e3-bbe5-6a2a3141e3a9\\_story.html](http://www.washingtonpost.com/business/capitalbusiness/general-dynamics-sees-flat-sales-despite-sequestration-and-shutdown/2014/01/22/97084f4a-837c-11e3-bbe5-6a2a3141e3a9_story.html).
- Choudhury, Santanu. "India Increases Defense Budget to \$37.7 Billion." *The Wall Street Journal*, <http://www.wsj.com/articles/SB10001424127887324662404578331762186925312>.
- Clark, Colin. "Push to Keep Lima Tank Plant Gathers Steam Before HASC Markup." *BreakingDefense.com*, May 21, 2013, <http://breakingdefense.com/documents/push-to-keep-lima-tank-plant-gathers-steam-before-hasc-markup/>.
- Clark, Colin. "South Korea Dumps Boeing F-15 for Stealth; F-35 Pacific Sweep Likely." *BreakingDefense.com*. September 24, 2013, <http://breakingdefense.com/2013/09/korea-dumps-boeing-f-15-for-stealth-f-35-pacific-sweep-likely/>.
- Cordesman, Anthony. "Saudi Arabia Enters the Twenty-first Century: The military and international security dimensions." Westport: Greenwood Publishing Group, 2003.
- Davenport, Christian. "Lockheed Martin Eyes International Sales, Increased R&D." *The Washington Post*. June 9, 2014.
- Department of Defense FY 2016 Budget Proposal, [http://www.defense.gov/home/features/2015/0215\\_budget/](http://www.defense.gov/home/features/2015/0215_budget/)
- Defense Industry Daily, "Brazil Buys Saab's JAS-39 E/F Gripen over Rafale, Super Hornet," November 19, 2014.
- Defense Procurement and Acquisition Policy, "Offsets of Foreign Military Sales," [http://www.acq.osd.mil/dpap/cpic/ic/offsets\\_of\\_foreign\\_military\\_sales.html#\\_ftn1%23\\_ftn1](http://www.acq.osd.mil/dpap/cpic/ic/offsets_of_foreign_military_sales.html#_ftn1%23_ftn1).
- De Vore, Marc R. "The Arms Collaboration Dilemma: Between Principal- Agent Dynamics and Collective Action Problems." *Security Studies*, 20:4, 624-662, 2011.
- Downes, E. Richard. "Trust, Engagement, and Technology Transfer: Underpinnings for U.S.-Brazil Defense Cooperation." *Institute for National Strategic Studies-Strategic Forum*, August 2012.

Dunne, J. Paul. "Developments in the Global Industry from the End of the Cold War to the mid-2000's." *The Modern Defense Industry*. ed. Richard Bitzinger. Santa Barbara: Praeger Security International/ABC-CLIO, 2009.

Eckstein, Megan. "Carter Unveils New Collaboration Opportunities Between U.S., Indian Defense Industries." *Defense Daily*, Vol. 260 No. 1, September 30, 2013.

Economic Times, "After 32 years, India finally gets LCA Tejas aircraft," January 17, 2015, [http://articles.economictimes.indiatimes.com/2015-01-17/news/58175338\\_1\\_lca-tejas-defence-minister-manohar-parrikar-final-operational-clearance#slide1](http://articles.economictimes.indiatimes.com/2015-01-17/news/58175338_1_lca-tejas-defence-minister-manohar-parrikar-final-operational-clearance#slide1)

Ellman, Jesse, Gregory Sanders, and Rhys McCormick, "U.S. Department of Defense Contract Spending and the Industrial Base, 2000-2013," *CSIS*.

Felstead, Peter. "Farnborough 2014: Raytheon Targets Domestic Hot Spots While Pursuing Increased International Sales." *Janes.com*, July 17, 2014, <http://www.janes.com/article/40941/farnborough-2014-raytheon-targets-domestic-hot-spots-while-pursuing-increased-international-sales>.

"Foreign Corrupt Practices Act," The United States Department of Justice, accessed April 24, 2015, <http://www.justice.gov/criminal/fraud/fcpa/>.

Freedberg, Sydney, Jr. "BAE Storms Hill For Bradley Funding to Keep Penn. Plant Alive." *Breaking Defense*, March 14, 2013, <http://breakingdefense.com/2013/03/bae-storms-hill-for-bradley-funding-to-keep-penn-plant-alive/>, accessed April 22, 2015.

Freedberg, Sydney, Jr. "Military 'Aggressively Working' to Ease Drone Sales Abroad." *BreakingDefense.com*, August 9, 2012, <http://breakingdefense.com/2012/08/military-aggressively-working-to-ease-drone-sales-abroad/>.

General Dynamics 2013 10K.

"General Dynamics Company Profile." Capital IQ. March 3, 2015. Standard & Poor's.

Gilman, Derek. "Foreign Military Sales." Defense Security Cooperation Agency, September 30, 2014.

"Global Patriot Solutions," Raytheon.com, Products Page.

Gould, Joe. "US Army Talks Tanks as Russia's Hit Ukraine," *Defense News*, February 19, 2015, <http://www.defensenews.com/story/defense/land/army/2015/02/19/russia-armor-tank-ukraine-europe-poland-baltics-abrams-bradley/23555365/>, accessed April 22, 2015.

Halperin, Morton H. and Kristen Lomasney. "Playing the Add-On Game in Congress: The Increasing Importance of Constiuent Interests and Budget Constraints in Determining

- Defense Policy.” *The Changing Dynamics of U.S. Defense Spending*. ed. Leon V. Sigal, (Westport: Praeger).
- Harrison, Todd. “Analysis of the FY 2014 Defense Budget.” *Center for Strategic Budgetary Assessments*.
- “Have Guns, Will Upgrade: The M109A7 Paladin PIM Self-Propelled Howitzer.” *DefenseIndustryDaily.com*, November 2, 2014, <http://www.defenseindustrydaily.com/have-guns-will-upgrade-the-m109a6-paladin-pim-partnership-04039/>, accessed April 22, 2015.
- Hayward, Keith. “The Globalization of Defense Industries.” *The Modern Defense Industry*, ed. Richard Bitzinger. Santa Barbara: Praeger Security International/ABC-CLIO, 2009.
- Hennigan, W.J. “Obama Administration to Allow Allied Countries to Buy Military Drones.” *Los Angeles Times*, February 17, 2015. <http://www.latimes.com/nation/la-na-drone-sales-20150217-story.html>.
- Hoyos, Carola. “Lockheed Launches Overseas Division.” *Financial Times*. July 1, 2013, <http://www.ft.com/intl/cms/s/0/8e351e10-e260-11e2-a7fa-00144feabdc0.html>.
- Insinna, Valerie. “BAE Avoids Plant Shut Down...For Now.” *National Defense Magazine*, October 2013. <http://www.nationaldefensemagazine.org/archive/2013/October/Pages/BAEAvoidsPlantShutDown%E2%80%A6ForNow.aspx>, accessed April 22, 2015.
- Jaisinghani, Sabarika. “Update 2- Northrop Grumman Expects International Markets to Drive Growth.” *Reuters*, January 29, 2015, <http://www.reuters.com/article/2015/01/29/northrop-grumman-results-idUSL4N0V85XA20150129>.
- Korb, Lawrence J. and Katherine Blakeley. “Defense Budget Déjà vu.” *Center for American Progress*, February 9, 2015.
- Kriz, Katie. “Raytheon to Focus on International Market as US Government Business Declines.” *SatelliteToday.com*, January 31, 2014.
- Leigh, David and Rob Evans. “The Lockheed Scandal.” *The Guardian*, accessed April 24, 2015, <http://www.theguardian.com/world/2007/jun/08/bae35>.
- Lerman, David and Robert Wall. “U.S. Defense Contractors Focus on Foreign Buyers.” *Bloomberg*, November 13, 2014, <http://www.bloomberg.com/bw/articles/2013-11-14/2014-outlook-u-dot-s-dot-defense-contractors-focus-on-foreign-buyers>.
- Lockheed Martin 2014 10K.

- M109A7, *BAESystems.com*, Products Page,  
[http://www.baesystems.com/product/BAES\\_020013/m109a7](http://www.baesystems.com/product/BAES_020013/m109a7).
- Magnier, Mark. "India Bribery Scandal Threatens to Ground \$750-million Helicopter Deal." *Los Angeles Times*, February 13, 2013, <http://articles.latimes.com/2013/feb/13/world/la-fg-wn-india-helicopter-20120213>.
- Mehta, Aaron. "3DELRR Illustrates New Export Reality." *DefenseNews.com*, October 14, 2014, <http://archive.defensenews.com/article/20141014/DEFREG02/310140032/3DELRR-Illustrates-New-Export-Reality>.
- Mehta, Aaron. "USAF Looks to Global Hawk Upgrades." *DefenseNews.com*. March 7, 2015, <http://www.defensenews.com/story/defense/air-space/isr/2015/03/07/global-hawk-looks-to-future-upgrades/24120821/>.
- Moravcsik, Andrew. "Arms and Autarky." *MIT Press*, Vol. 120, No. 4.
- Neelu, Khatri, "Ins and Outs of Indian Defense," *Aviation Week and Space Technology*, vol. 174, issue 9.
- Neuman, Stephanie, "Power, Influence, and Hierarchy: Defense Industries in a Unipolar World." in *The Modern Defense Industry*. ed. Richard Bitzinger. Santa Barbara: Praeger Security International/ABC-CLIO, 2009.
- Northrop Grumman 2013 10K.
- "Northrop Grumman Company Profile." *Capital IQ*. March 3, 2015. Standard & Poor's.
- Norton-Taylor, Richard. "Saudis and Egypt among biggest markets for UK arms despite human rights breaches," *The Guardian*, June 23, 2014, <http://www.theguardian.com/world/defence-and-security-blog/2014/jun/23/egypt-saudi-arabia-arms-sales-human-rights>.
- Oxford Business Group. "Saudi Arabia: Increased Security: Defence Offsets Programme Helps to Create Local Benefits."
- Parodi, Emilio. "Finmeccanica looks to rebuild India ties after former head convicted." *Reuters*, <http://in.reuters.com/article/2014/10/09/finmeccanica-india-idINKCN0HY14Y20141009>.
- Perrett, Bradley, Bill Sweetman, and Amy Butler. "South Korean Fighter Order: AF Backs F-35." *AviationWeek.com*, August 26, 2013, <http://aviationweek.com/awin/south-korean-fighter-order-af-backs-f-35>.
- Pocock, Chris. "Huge Saudi F-15 Sale Confirmed." *AINOnline.com*. January 6, 2012.

Raghuvanshi, Vivek. "India, U.S. Advance Strategic Relations." *Defense News*, January 28, 2015, <http://www.defensenews.com/story/defense/policy-budget/industry/2015/01/28/india-obama-modi-dtti-us-agreement-weapons-coproduce-bilateral-russia/22457599/>.

Raghuvanshi, Vivek. "India May Sign Helo Deal by Boeing Deadline." *DefenseNews.com*, February 19, 2015, <http://www.defensenews.com/story/defense/air-space/air-force/2015/02/19/india-boeing-helicopter-apache-chinook-russia-funding-deadline-march-31/23622157/>.

Ramady, M.A. "The Saudi Arabian Economy: Policies, Achievements and Challenges." New York: Springer, 2005.

Raytheon 2013 10K.

Rohlf, Chris and Ryan Sullivan. "The MRAP Boondoggle." *Foreign Affairs*, July 16, 2012, <http://www.foreignaffairs.com/articles/137800/chris-rohlf-and-ryan-sullivan/the-mrap-boondoggle>.

Samuels, Richard J. *Rich Nation, Strong Army: National Security and the Technological Transformation of Japan*. Ithaca: Cornell University Press, 1994.

Sapolsky, Harvey M., Eugene Gholz, and Caitlin Talmadge. *U.S. Defense Politics: The Origins of Security Policy*. London: Routledge, 2008.

"Saudi Arabia Country Profile," *FAS.org*, [http://fas.org/asmp/profiles/saudi\\_arabia.htm](http://fas.org/asmp/profiles/saudi_arabia.htm), accessed March 3, 2015.

"Saudi Arabia Eclipses India as World's Largest Weapons Importer," *Jerusalem Post*, March 8, 2015, <http://www.jpost.com/Middle-East/Saudi-Arabia-eclipses-India-as-worlds-largest-weapons-importer-393262>.

Scott, Alwyn. "BAE Systems U.S. CEO says Expect Declining of Flat Sales." *Reuters*, September 4, 2013, <http://www.reuters.com/article/2013/09/04/us-aerospace-defense-idUSBRE9820Y820130904>.

Shalal, Andrea. "Update 2-U.S. Air Force to Re-Evaluate Bids in Radar Contract." *Reuters*, January 21, 2015, <http://www.reuters.com/article/2015/01/22/usa-pentagon-raytheon-idUSL1N0V025820150122>.

Shalal-Esa, Andrea. "Lockheed Sees F-16 Fighter Jet Production Continuing Through 2020." *Reuters*, December 14, 2013, <http://www.reuters.com/article/2013/12/14/lockheed-f-idUSL2N0JT03T20131214>.

Shalal-Esa, Andrea. "Raytheon Sees 'Never-Ending Opportunity' in Patriot Missile System." *Reuters*, August 5, 2013, <http://www.reuters.com/article/2013/08/05/us-raytheon-patriot-idUSBRE9740QZ20130805>.

SIPRI Military Expenditure Database 2012, <http://milexdata.sipri.org>.

Sisk, Richard. "Airstrikes Hit MRAPs and Humvees Captured by ISIL." *Military.com*, August 15, 2014, <http://www.military.com/daily-news/2014/08/15/airstrikes-hit-mrap-and-humvees-captured-by-isil.html>.

"South Korea to Sign Deal this Month to Buy 40 F-35 jets for \$7billion: sources." *Reuters*, September 24, 2014, <http://www.reuters.com/article/2014/09/24/us-southkorea-airforce-orders-idUSKCN0HJ0P620140924>.

Upgrading Howitzers for Chile, *BAESystems.com*, Newsroom Page.

U.S. Department of Defense. "Estimated Impacts of Sequestration-Level Funding." April 2014.

"US Will Sell Global Hawks- Will South Korea Buy," *DefenseIndustryDaily.com*, November 3, 2013., <http://www.defenseindustrydaily.com/report-us-agrees-to-sell-global-hawks-to-south-korea-05032>

Van Wagenen, Juliet. "Northrop Grumman CEO Sees Sequestration Squash Domestic Growth as International Sales Flourish." *AviationToday.com*, February 4, 2015, [http://www.aviationtoday.com/av/military/Northrop-Grumman-CEO-Sees-Sequestration-Squash-Domestic-Growth-as-International-Sales-Flourish\\_84116.html#.VQxbHmTF\\_38](http://www.aviationtoday.com/av/military/Northrop-Grumman-CEO-Sees-Sequestration-Squash-Domestic-Growth-as-International-Sales-Flourish_84116.html#.VQxbHmTF_38).

Walker, Richard W. "Northrop Targets International Markets for Future Opportunities." *WashingtonTechnology.com*, June 15, 2014, <http://washingtontechnology.com/articles/2014/06/15/top-100-northrop.aspx>.