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DEFENSE INDUSTRIAL BASE AT A CROSSROADS

by

Gail C Allen, Lt Colonel, USAF

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*Abstract*

The United States enters the 21<sup>st</sup> century as the premier military force in the world, in part because the US industrial and technology base is the strongest in the world. The defense industrial base has gone, and is still going through, dramatic transformation. With the collapse of the Berlin Wall in 1989 and subsequent breakup of the Soviet Union in 1991, profound changes have swept over the global political landscape. The US and its coalition partners face a dynamic security environment, marked by dramatic and constant geopolitical, military, economic, and technological change. The US recognizes that the health of its national security, the health of its defense industry, and the health of the NATO alliance are intertwined and that both sides of the Atlantic need viable defense industries in order to manage foreign policy. As a result, American and European governments and industry are struggling to respond to the upheaval brought about by the end of the Cold War. Major defense procurement decisions carry with them far greater implications for the industrial and technological base of the Atlantic alliance than they did during the Cold War. Consequently, both sides must consider carefully the implications for the alliance of its procurement decisions and practices to ensure this century is more peaceful and stable than the century before it.

With a new President committed to defense reform, US defense officials and industry executives believe now is an opportune time to reform the way the nation acquires weapons and military equipment. The new Secretary of Defense, Donald

Rumsfeld, in his recent confirmation hearing, listed reform of DoD structures, processes, and organization as one of his five top priorities. He said, “The legacy of obsolete institutional structures and processes and organizations does not merely create unnecessary costs, which of course it does; it also imposes an unacceptable burden on national defense...In certain respects, it could be said that we are in a sense disarming or ‘underarming’ by our failure to reform the acquisition process and to shed unneeded organization and facilities.”<sup>1</sup> At stake in this reform effort and of utmost importance to national security is the strength of the defense industrial base and at the same time, enhanced, more interdependent trans-Atlantic industrial ties. Current trends in the European and US defense markets, however, point in contradictory directions. The wise advice of the famous philosopher, Yogi Berra, who said, “when you come to a fork in the road, take it,” clearly seems appropriate as the future of the US defense industrial base and trans-Atlantic defense relationship stands at a critical juncture. A ‘fortress’ on each side of the Atlantic could likely emerge with each country protecting its companies and technologies. On the other hand, limited resources and trends in globalization could be an integrating force leading to a more flexible, trans-Atlantic trade and industrial regime. Together, the US and Europe must successfully navigate the balance between competition and cooperation, as it will have far reaching national security consequences for years to come.

This paper will first look at a brief history of how the structure and character of the defense industrial base has changed. It will address the drivers of transformation, specifically, the changes in the defense budget, the security environment, technological advances, and the impact of globalization. It will then describe the profound effects these

changes have had on the current structure of the defense industrial base. The paper will look at trends for both the US and for Europe and compare and contrast how each has progressed with consolidation and rationalization efforts and then assess the financial health of the industry. Given this assessment, the paper will discuss what steps US is taking to establish transatlantic industrial linkages that promote both cooperation and competition. Finally, it looks at the benefits to be gained and the long-term challenges that must be overcome to ensure the US meets its 21<sup>st</sup> century national security needs and the NATO alliance remains strong and viable.

### **Notes**

<sup>1</sup> Confirmation Hearing before the Senate Armed Services Committee, January 2001

## **Chapter 1**

# **History of the Defense Industrial Base**

## **United States**

The Cold War is over and in its aftermath the American government and its industry are still adjusting to the new realities. The manner by which the US obtains the capabilities to equip its military has undergone dramatic change over the 20<sup>th</sup> century. The Cold War defense industrial base we have today is, in many respects, an artifact of this unusual period in history. To better understand how and why our industrial base evolved to where it is today, a brief recap of its history is helpful.

Through WWI and WWII, the US did not maintain a distinct industrial sector dedicated to supplying the government with weapons. Instead, the government opted to maintain arsenals for critical, defense-unique capabilities like munitions and warships while contracting out most supply and service requirements. In times of crisis, the government would turn to the larger national industrial base to build the necessary productive capacity. Private industry was expected to expand existing defense production, convert existing commercial capacity to the production of war material or to operate the new plants and factories built with government funds. Any distinction

between commercial firms and those supplying defense products was a function of the inherent differences in the goods themselves. <sup>1</sup>

After WWII, however, the nation, did not, as in previous times, demilitarize its vast defense industrial base created to support the war effort. A new war confronted America and its allies and in some ways was more demanding of the industrial and scientific base than had been the previous war. The “permanent” state of confrontation that characterized the Cold War necessitated the creation of an equally “permanent” defense industrial base. Strategic warning was not sufficient to enable a nation to mobilize resources and build an adequate military capability. Moreover, in the event of conflict between the two superpowers, the likely high tempo of operations and short duration of the war meant that the US would have had to fight with only those forces and weapons it was able to deploy prior to hostilities. As a result, the US and its allies had to build and deploy in peacetime the weapons and forces they would need to fight a possible war with the Soviet Union and its allies.

In addition, both sides sought strategic and political advantage during the conflict by means of deploying more capable weapons systems. Unwilling or unable to match its adversary soldier for soldier and weapon for weapon, US and allied strategy was to use its qualitative superiority—both in technology and in training of its soldiers—to counterbalance the Warsaw Pact’s greater opposing numbers. This “offset strategy” was based on first, fielding superior technology through aggressive pursuit of military R&D, and second, developing a high-technology defense industrial base. The latter included denying the adversary that technology through a system of export controls and protection of technological secrets.<sup>2</sup>

The search for strategic and military advantage in the Cold War led to a profound change in the relationship between government and the industries relied on for production of defense goods. The fear of being outpaced by our adversary, technologically or quantitatively, created a demand by the government for industry to push the envelope of advanced technology in effort to develop superior weapon systems. The government began investing heavily in the creation of production facilities, depots, and laboratories, many owned and operated by private corporations but others government-owned and contractor operated (GOCOs). Government investments in military R&D resulted in development of many technologies that had no equivalent civilian application at the time they were developed. Over the first half of the Cold War government R&D, primarily for military purposes, was a major force driving technological innovation in the US. Government procurements created a pull for private sector R&D. Government funded R&D coupled with private sector R&D accelerated development and commercialization of new technologies.<sup>3</sup>

Over the decades of the Cold War, the federal government imposed standards and regulations on defense industries that increasingly divided the behavior of companies performing defense-related work and those employing commercial practices. These unique requirements were imposed to further support what were considered important government and national interests: socio-economic equity, competition, prevention of fraud, waste, and abuse, and prevention of casualties through defective manufacturing. Defense-oriented companies were forced to develop structures and practices in order to adhere to federal contracting practices, standards, and specifications. They, in turn, factored these costs associated with conforming to defense-unique requirements into the

price of their products. The separation of defense and commercial operations carried additional, less tangible, costs on defense companies resulted as well. Among these were a relative insensitivity to the problem of affordability of products, reduced agility in responding to changes in technology, an inability to translate advanced, even unique, technologies from the defense environment into the commercial world and eventually, limiting the ability to feed the results of advances occurring in the commercial world into defense activities.<sup>4</sup>

The circumstances that gave rise to the creation of a dedicated DIB no longer exist. The end of the Cold War ushered in an entirely different context for defense. Large defense budgets and long production runs are a thing of the past. Today we buy fewer new platforms, extend the life of older ones and update their black boxes. Much of the critical tech DoD needs today—software, networking, and communications—is developed and provided by commercial sources. Many areas of innovation in weapons have broad commercial application and cutting-edge commercial innovation increasingly drives the process of innovation in weapons systems. As the dividing line between civil and military activities continue to blur, DoD has begun moving away from its Cold War-era unique specifications and has realized that its counterpart legacy acquisition system is increasingly counterproductive. For these reasons, DoD must define its rules differently and develop new ways to use its industrial base to ensure the resulting acquisition system best serves national security.

## Europe

In contrast to America, government ownership and operation of defense industry in Europe is prevalent. Throughout the 20th century, Europe also did not want to confront a technologically superior enemy, or be unable to win a war of attrition. Europe recognized the importance of sponsoring and sustaining national defense industries to protect national security. The defense industries were, in essence, a manifestation of national sovereignty. Article 223 of the 1957 Treaty of Rome provides the legal authority to exempt defense industries from competition and free market rules in order to protect security interests.<sup>5</sup> Within the protective shroud of national security, the defense business evolved, insulated, more often than not, from commercial pressures and disciplines. Whereas US defense giants had one customer—the Pentagon, in Europe nothing comparable existed. Each European defense ministry bought its own equipment, and most countries had at least one state-owned company producing weapons. Large and complex procurement establishments defined needs and requirements, negotiated contracts with suppliers, oversaw development and imposed unique accounting and security restrictions on private enterprise. In some cases, the state assumed full control of the leading national companies.<sup>6</sup>

The end of the Cold War brought with it changes for Europe as well. Unlike the US where there was a rush to consolidate, the trend in Europe was more gradual. Complex ownership structures and differing defense requirements made cross-border merger more difficult and impeded industrial integration. Europe's preference was to preserve the existing national industrial capability, although at a reduced level of activity. To varying degrees, industry restructuring occurred within the borders of major European defense

producing nations. Western Europe's combined defense expenditures, about 60% of the US defense budget, could in no way sustain its large number of firms, about 2-3 times more suppliers than the US.<sup>7</sup> Completion of the single market in Europe, capped by the launch of the Euro, has added to the urge to achieve pan-European economies of scale and leading to increasing transparent flow of commercial goods and services across national boundaries and a growing trend toward global markets. While the trend in consolidations has been led by non-defense sectors, the defense sector is gaining momentum. Pressures from rapid US defense industry consolidation, tighter defense budgets, and stronger competition in the global defense market, has further prompted European defense industry to consolidate and restructure in order to achieve a more efficient use of capital and a more competitive industrial and commercial structure. Like their US counterparts, European firms are increasingly turning to teaming arrangements, joint ventures, mergers, and acquisitions to find the technological synergies and economies of scale required to remain competitive in a global economy. Although much progress has been made, Europe still has a fragmented series of nation-states each at various stages of consolidation and rationalization.

### Notes

<sup>1</sup> CSIS Senior Policy Panel on the US Defense Industrial Base, *Defense Restructuring and the Future of the US Defense Industrial Base*, Project Co-chairs James R Schlesinger and Murray Weidenbaum, (Center for Strategic and International Studies, Washington D.C., 1998), 12.

<sup>2</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future* (MIT Press, 2000), 129.

<sup>3</sup> CSIS Senior Policy Panel on the US Defense Industrial Base, *Defense Restructuring and the Future of the US Defense Industrial Base*, Project Co-chairs James R Schlesinger and Murray Weidenbaum, (Center for Strategic and International Studies, Washington D.C., 1998), 13.

## Notes

<sup>4</sup> Ibid , 13.

<sup>5</sup> Alfred G. Volkman, “European Defense Industry Perspectives, The American Viewpoint,” address.

<sup>6</sup> “Europe’s Defence Identity: A Transatlantic Future?” Centre for European Reform, Aug 1999, 10.

<sup>7</sup> Gordon Adams, “The Transatlantic Defence Market and ‘Fortress America’: Obstacles and Opportunities,” Western European Union, 22 November 2001.

## **Chapter 2**

### **Drivers of Change**

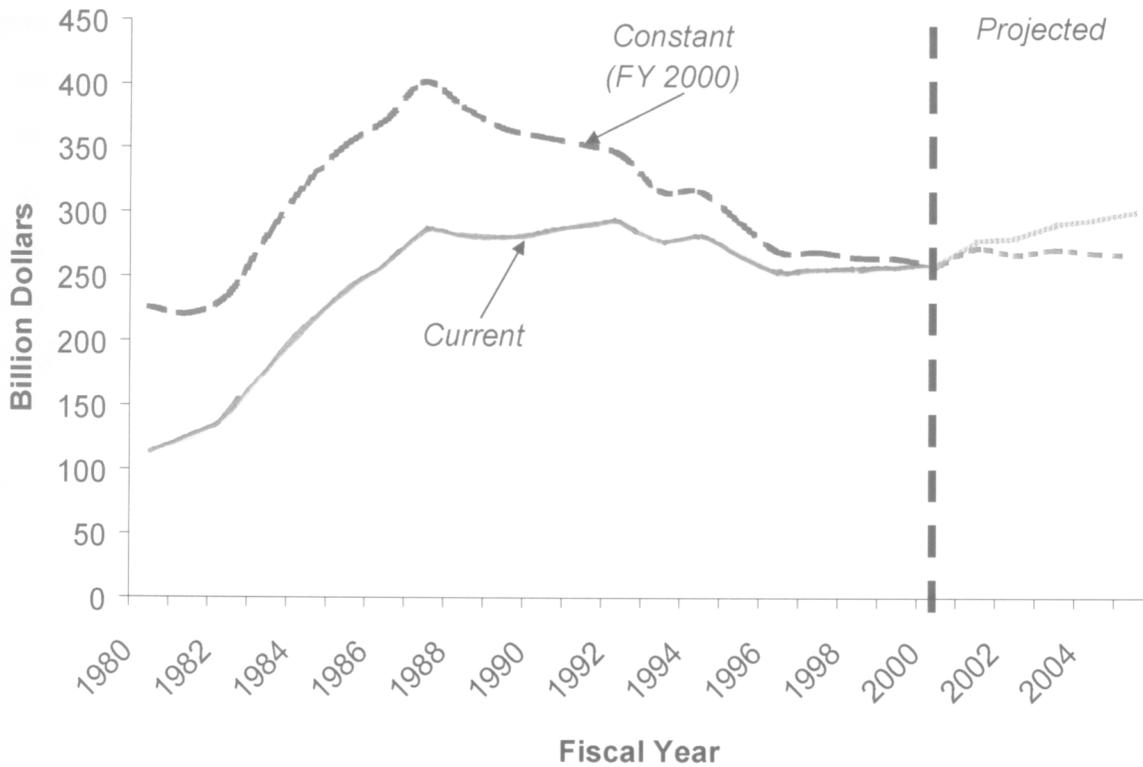
The end of the Cold War certainly gave impetus to the pressures for change and influenced the entire nature of the government-industry relationship. New conditions necessitated changes in the character of the defense industrial base on a scale and at a pace in excess of anything that could have been expected. The primary drivers of change have been:

- Shrinking defense budgets following the collapse of the Soviet Union
- Changing security environment and defense strategy
- Era of globalization

### **Declining Budgets**

Over the past decades, dramatic shifts in the defense budget, the river from which defense industry revenues flow, has produced equally dramatic changes in the defense industrial landscape. Defense contractors, large and small, faced numerous challenges in the post-Cold War era. Many became more defense dependent as industry enjoyed an unprecedented real demand increase of 50% in budgeted procurement from 1978-87. With outlays of about three years, this demand carried them into the early 90s. In the aftermath of the Cold War the defense industry came under enormous pressure to restructure in order to face a radical change in the economic environment. With a

growing preoccupation with budget deficits, sharply downsized defense budgets, and much smaller market for their products, defense spending dropped 40% from its Cold War peak of the mid 1980s.<sup>1</sup>

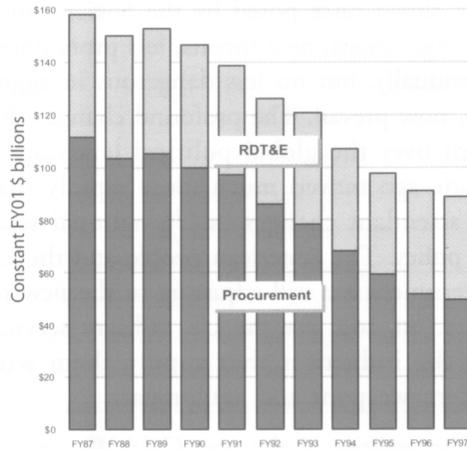


Source: Office of Management and Budget

**Figure 1: National Defense Budget Authority 1980-2004**

**Source:** Booz-Allen & Hamilton. *US Defense Industry Under Siege—An Agenda for Change*, December 2000, 10.

Particularly relevant to the defense industrial base are the modernization accounts: Research, Development, Test and Engineering (RDT&E) and procurement. Procurement declined by more than 66% (\$130B to \$40B) between FY85-00 and the RDT&E budget went down 15%.<sup>2</sup> Together the investment budget experienced a dramatic 45% drop in spending between FY87-99.<sup>3</sup>

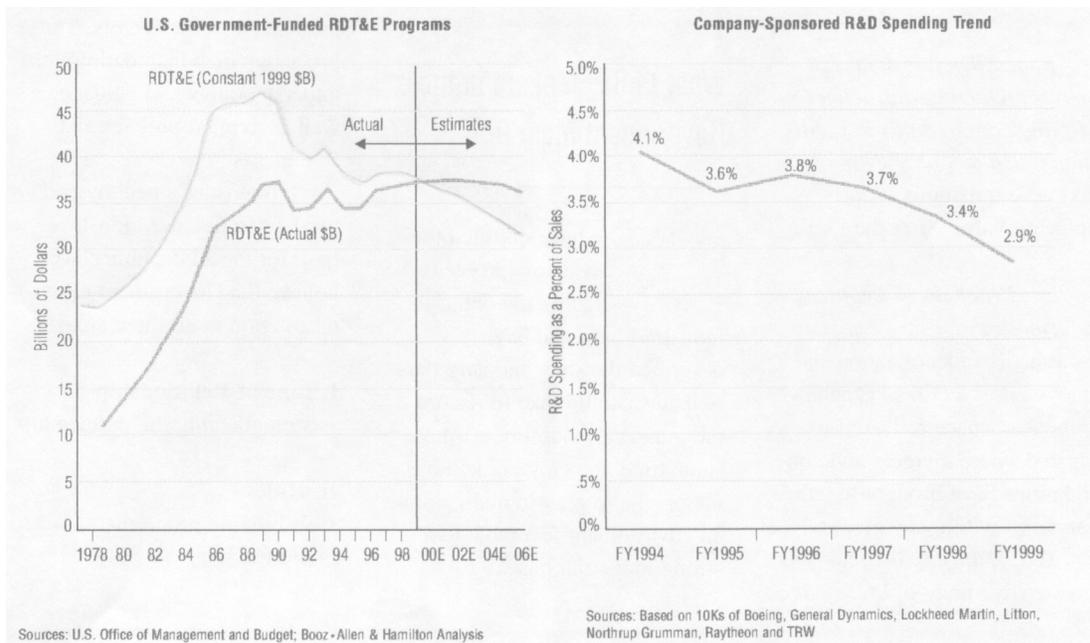


**Figure 2: US Defense Procurement & RDT&E Budget FY87-FY97**

**Source:** AIAA Defense Reform 2001, “A Blueprint for Action: Setting the Stage,” February 2001, 2.

Through the 1990s while the Administration’s strategy allowed DoD to modernize in the short-term by phasing out older systems more quickly, deferring that requirement created a longer-term problem. By having to modernize large portions of the aging force at the same time, a “bowwave” in which required modernization funds exceed defense budget projections, occurs.<sup>4</sup> Although still not enough to meet modernization needs, the procurement account, has increased to 21% of the total DoD budget in FY01 and the FY05 budget is planned to be 19% higher than the post Cold War low of 1998.<sup>5</sup> The modernization portion of the budget increased in real terms, adjusted for inflation, 3.2% from FY00-01 although the newly released FY02 budget shows procurement declining \$2.6B. Any additional increases won’t be considered until the Administration completes its defense strategy review. An increase in future procurement is needed if the Administration intends to renew focus on modernizing the warfighters’ arsenal and ensure military superiority is maintained.

US technological superiority—a cornerstone of the US defense strategy—also requires investments in R&D. With pace of technological change accelerating and fewer new systems forecasted, R&D activities help meet this challenge. The recent R&D budget proposes an increase of \$3.6B for FY02 and an additional \$20B over 5 years for new “leap ahead” technology projects and continued development of a missile defense system. In spite of this increase, there are disturbing trends in the amount and manner defense industry spends its R&D funds. According to the National Science Foundation, the global total for scientific R&D spending in year 2000 was \$360B, half as much, in constant dollars, as in 1980. The US still accounts for half the total, about \$180B, but today’s DoD share is only 1/12 of the total compared to 1/6 in 1980.<sup>6</sup> Equally disturbing are the downward trends for both DoD- funded and company-sponsored R&D. For major contractors, total annual spending is about \$2.9 B, down 43% since early 90s.<sup>7</sup>

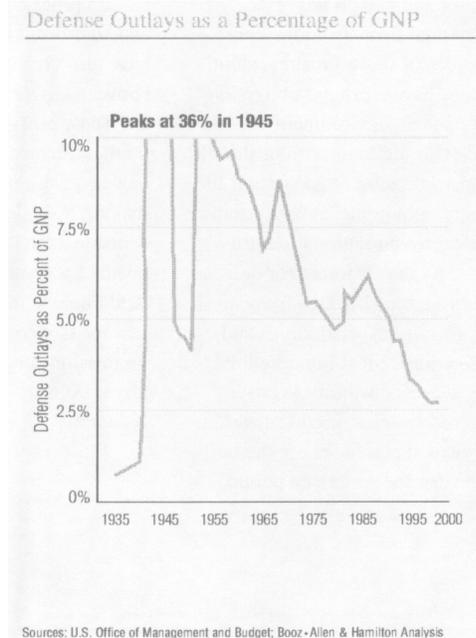


**Figure 3: Decline in R&D**

**Source:** Booz-Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 8.

Compounding the problem is the fact that Independent Research & Development (IR&D), paid for by the government but spent at discretion of contractor, has become less “independent.” Higher percentages are being directed by the government to support on-going legacy systems rather than for launching new enabling technologies. That is, since 1980 “R” has decreased from 31% to 12% whereas “D” has increased from 69% to 88%.<sup>8</sup> A June 2000 Study on the Status of the Aircraft Industry also illustrates these disturbing trends. The report concluded that aerospace R&D funding has fallen by over 50% from a 25-year peak in 1987. The timeframe within which industry expects to receive an adequate return on an R&D investment has shortened to less than 10 years.<sup>9</sup> As much as 80-90% of R&D resources now are committed to short-term development and process improvements, which only increase the long-term risks to the US. These trends indicate that tomorrow’s defense innovations will largely be derivatives of technology developed and marketed by commercial companies for commercial purposes.

In terms of the larger national fiscal environment, the defense industry has shrunk as the rest of economy has grown. As a percentage of GNP, defense has been declining consistently since its 35% peak in 1945. Current federal spending on defense now amounts to only 3% of GDP, just half of FY85, when it consumed 6% GDP and the lowest percentage since the late 1930s.



**Figure 4: Defense Outlays as a Percentage of GNP**

**Source:** Booz-Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 7.

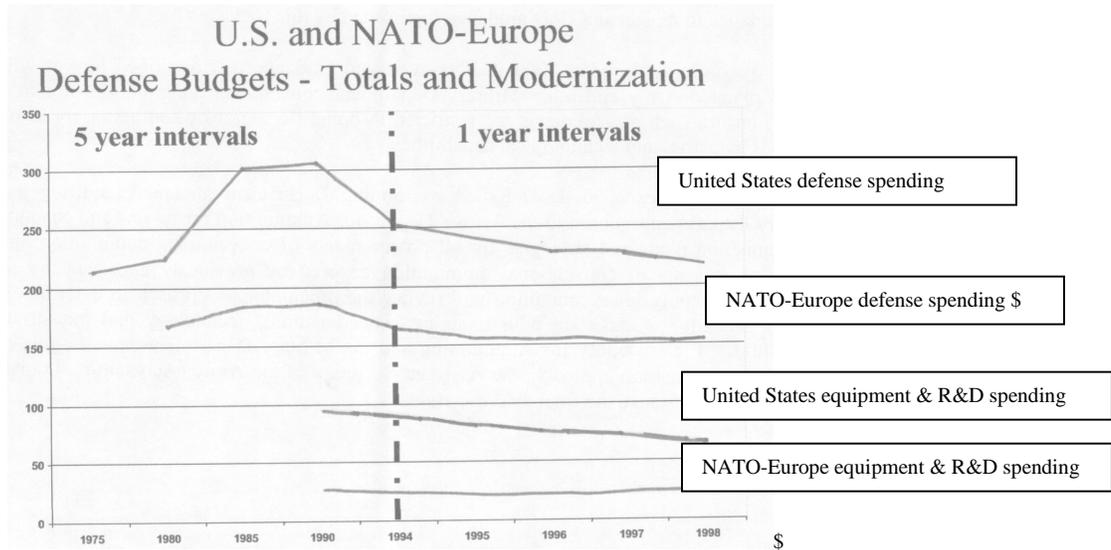
Downward pressures on federal outlays for defense will continue. Even with budget surpluses obtained the last few years, federal discretionary spending is increasingly constrained by the rapid growth in entitlements. The proposed FY02 budget of \$310.5B is a modest 4.8% increase over last year's enacted amount and availability of significant additional funds in the near future is doubtful.

In addition to smaller budgets, the end of the Cold War brought a reduction in personnel and force structure. As spending declined by 40%, the number of soldiers, sailors, and airmen on active duty decreased from its 1990 high of 2.1 million to 1.4 million. The Navy has gone from 15 to 10 active carrier battle groups, the Army from 18 to 10 divisions, and the Air Force from 24 tactical fighter wings to 12 fighter wing equivalents. Additionally, the defense industrial base had to shrink to match the

declining resources of its primary customer. Employment in entire defense industry dropped one-third from 1.4M in 1990 to 878K in 1999.<sup>10</sup>

## Europe

In stark contrast to the US, Europe's FY00 defense budget amounts to approximately \$145B, or only 1.8% of GDP. European NATO allies spend about 60% of the US defense budget and only about \$9.7B (in '97\$) on R&D, about 1/4 of the US R&D budget. Moreover, the US budget is increasing whereas Europe's budgets are under continued downward pressure to meet the Maastrick Treaty convergence criteria for the Euro.<sup>11</sup>



**Figure 5: US and NATO-Europe Defense Budget Totals and Modernization 1975-98**

**Source:** Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 28.

The significant reduction in NATO procurement budgets encouraged industry to rationalize and resize in order to remain profitable. The various NATO countries handled the effects of the Cold War retrenchment differently. In the UK, cuts were made with aim of maintaining the front-line fighting forces and the defense equipment program. Germany suffered equally badly, principally due to problems of reunification and the

absorption of the former East Germany. France at first seemed immune to these problems but now is facing up to a 25-30% reduction in defense equipment expenditures at same time its nationalized industry are requiring large sums for recapitalization.<sup>12</sup>

In the last decade, Britain has seen the loss of 380k high-tech, high paying defense jobs and Germany’s defense employment has dropped from 280k to 90k. France, which has yet to tackle the majority of its over-capacity, has lost 90k defense jobs. At the same time trans-Atlantic defense trade has become even more lopsided. In 1995 according to the US Arms Control and Disarmament Agency, the US delivered \$3.1B worth of defense equipment to Europe while importing less than \$60M. Europe’s substantial job and defense industrial base loss and its sharp increase in US arms imports has fueled resentment, especially in France, toward the US.<sup>13</sup>

**Figure 6:** The Decline in Defense Expenditures 1985-1997

| Country | 1985<br>US\$M(current year) | 1997<br>US\$M (current year) | %Decline |
|---------|-----------------------------|------------------------------|----------|
| US      | \$367,711                   | 272,955                      | 25       |
| UK      | 45,408                      | 35,736                       | 21       |
| France  | 46,522                      | 41,545                       | 10       |
| Germany | 50,220                      | 33,416                       | 33       |
| Italy   | 24,471                      | 21,837                       | 10       |
| Spain   | 10,731                      | 7,671                        | 28       |

**Source:** Gordon Adams et al, “Europe’s Defence Industry: A Transatlantic Future?,” *Centre for European Reform*, 2000, 11.

The average decline in NATO Europe defense budgets has been 26% since 1986 and this downward trend is likely to continue. The new NATO allies do not change this trend as their defense budgets have decreased at twice the average rate for the western European NATO allies.<sup>14</sup> Today, no major European ally, with the exception of the UK, is proposing defense budget increases. Unemployment rates remain high in France and

Germany and both governments are committed to high levels of social spending. The considerable gap between European and US defense spending, particularly procurement and R&D, highlights the importance of greater cooperation across the Atlantic, if only to more efficiently use scarce resources.

### **Changes in the Security Environment and Defense Strategy**

The US continues to face a dynamic and uncertain security environment. While the monolithic threat once posed by the Soviet Union no longer exists, America and its allies still face many new threats, just as dangerous, that span the entire threat spectrum.

Ethnic conflict, regional thugs, failed states, proliferation of missiles and weapons of mass destruction, and transnational threats, including terrorism, international crime and illegal drug trade, all present new challenges. Despite declining defense budgets and a shrinking force structure, the number of military deployments for humanitarian peacekeeping operations have drastically increased.

The defense strategy directs DoD to shape the international security environment in ways favorable to US interests; to respond to full spectrum of crises to protect US interests, and reaffirm the US role as a global leader; to prepare now to meet challenges of an uncertain future by pursuing the revolution in military affairs, exploiting the revolution in business affairs, and focusing modernization efforts. The strategy increasingly emphasizes the importance of joint and multinational force integration. The current and likely future geopolitical situation will generally force and often require coalition operations.

While US forces moved toward a high intensity, forward deployed expeditionary capability capable of full spectrum military operations, Europe's strategic and force planning did not evolve in the same way. With lower budgets going toward less technically advanced expeditionary capabilities. Europe stayed equipped with a personnel-heavy military with aging equipment that was increasingly difficult to operate in coalition operations. Recent experiences in the Kosovo air campaign underscore how wide the gap between Europe and US capabilities had become. Insufficient interoperability in critical areas, ranging from tactical communications to target identification impeded the coalition's ability to operate at maximum effectiveness.

In addition to the Kosovo experience, the Franco-British summit in Dec '98 at St Malo also had a major impact on European defense planning. At this meeting both countries, for the first time, agreed to provide Europe with the capacity for autonomous action, backed up by a ready, credible military force. In '99 the EU subscribed to the agreement and endorsed a Franco-British proposal to create a rapid reaction force of up to 60,000 troops. The EU reinforced the European commitment to "develop rapidly collective capability goals in the fields of C3I, intelligence and strategic transport."<sup>15</sup> These commitments move toward what is referred to as a Common European Security and Defence Policy (CESDP). The Europeans, however face a budgetary dilemma. Failure to augment European defense investment would mean relying more on the US. This could heighten trans-Atlantic tensions over burden sharing, since an un-modernized European military is viewed as a potential liability in coalition operations. At the same time, the US fears an increased European defense profile would lead to unnecessary duplication of capabilities and compete with NATO for scarce resources. Indeed, the

price tag associated with investing in C3I, surveillance, reconnaissance, sea and airlift, in-flight refueling, and other needed capabilities, would be significant.<sup>16</sup> If past performance is any indicator, the European defense budgets will not rise to meet the challenge.

Closer European defense cooperation reinforces the tendency toward a ‘fortress’ approach on each side of the Atlantic. At the same time, NATO’s parallel effort, the Defense Capability Initiative (DCI), reinforces the importance of growing trans-Atlantic cooperation as strengthened European capabilities increases the attractiveness of coalition operations. Given this underlying tension, coordination between these two recent efforts is critical so as not to reinforce fortress tendencies. The ability to lead and effectively conduct highly complex and integrated joint, multi-nation operation will require improving plans, doctrine, training, interoperability standards, and procedures for integrating US military forces with those of its allies and coalition partners. Europe increasing its defense spending and shouldering more responsibility for future allied military operations is a critical factor in the future cohesion of trans-Atlantic security relations.

### **Era of Globalization**

As SECDEF Rumsfeld stated in his recent confirmation hearing, “ Today with the Cold War Era history, we face a new era, the Post Cold War Era or Era of Globalization.”<sup>17</sup> The 1999 Defense Science Board (DSB) Task Force on Globalization and Security concluded that globalization is rapidly reshaping the defense industrial base and the military technology arena. This trend carries both risks and opportunities for DoD. In terms of risks, globalization threatens to erode American’s technological edge

in the post-Cold War era. The industry providing the underlying technology to support defense is now not only increasingly non-defense, but also increasingly non-American.<sup>18</sup> More and more, technology, especially information technology, originates in commercial companies, without the sponsorship of DoD.<sup>19</sup> Related to commercialization is globalization whereby leading-edge technology companies are increasingly global rather than purely American in their ownership, workforce, and markets. Globalization's most significant long-term effect is its "leveling effect on the international military-technological environment in which DoD must compete. Over time, all states—not just the US and its allies—will share access to much of the technology underpinning the modern military....Access to commercial technology is virtually universal, and its exploitation for both civil and military ends is largely unconstrained."<sup>20</sup> The task force says the Pentagon's failure to quickly adapt to both trends could lead to increased costs, diminished performance and declining interoperability within the NATO alliance.

The DSB task force recognizes that in spite of risks, globalization also offers opportunities. It urges increasing collaboration and integration of US and foreign defense industries, especially those in US and Europe, knowing that byproducts might very well include loss of some domestic industrial capabilities on both sides on the Atlantic and increased interdependence between the US and its allies. Allowing allied nations to produce equipment for the US military, however, may lead to greater interoperability of military doctrines and forces of future allied coalitions along with improved economies of scale. Additionally, other potential benefits include: increased access to offshore technology, capital, and skilled labor; stronger industrial competition which could help drive down costs and stimulate innovation; faster paced modernization through the

sharing of development cost; enhanced US-European interoperability and the narrowing of the US European technology gap; a firmer NATO industrial foundation, and greater dovetailing of politico-military interests among NATO nations resulting from industrial interdependency. The DSB panel declares that globalization “thwarts the protectionist, arch-competitive Fortress Europe/Fortress America defense trade blocs that could serve to widen the US-European military technological gap and weaken overall NATO integrity.”<sup>21</sup>

In summary, key changes in the global environment support the need for greater collaboration and integration of US and European defense industries; the need for enhanced interoperability with our coalition partners; the need for greater technological capability on the part of our partners, and the need to maintain competition in face of consolidation to ensure innovation and affordability. Trends in the US and European defense markets offer contradictory directions for the future of transatlantic industrial collaboration and integration. A divergence over global strategy could drive the US and its NATO allies apart, while a common concern over interoperability could drive them closer together. The effort to form a distinct and autonomous European defense capability, along with a European defense procurement agency, could reinforce divergent tendencies. Shrinking budgets, which incentivize trans-Atlantic efficiencies in spending, could push European to combine procurement on a continental basis and through joint acquisitions, protect a smaller European industrial base. Technological trends of globalization and commercialization should act as an integrating element across the Atlantic, but a shortfall of European investment, could instead perpetuate US technological superiority. These contradictory tendencies could lead to the emergence of

two fortresses, each protecting its companies and its technologies.<sup>22</sup> The US wants to avoid a ‘fortress’ approach which could result in the separate evolution of US and European military technologies, undermine interoperability and lead to sole source Europe firms selected as suppliers for political purposes. DOD favors industrial teaming, joint venture, and other forms of collaboration with coalition partners that are pro-competitive and security-enhancing.<sup>23</sup> These linkages support the need to leverage our national industrial base and leverage our allies’ industrial base.

### Notes

<sup>1</sup> Gerald I Susman and Sean O’Keefe, ed., *The Defense Industry in The Post-Cold War Era, Corporate Strategies and Public Policy Perspectives* (Elsevier Science Ltd., Oxford, UK, 1998), 124.

<sup>2</sup> Ibid, 322.

<sup>3</sup> CSIS Senior Policy Panel on the US Defense Industrial Base, *Defense Restructuring and the Future of the US Defense Industrial Base*, Center for Strategic and International Studies, Washington D.C., 1998, 14.

<sup>4</sup> Ibid, 14

<sup>5</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 17.

<sup>6</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future* (MIT Press, 2000), 134.

<sup>7</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 13.

<sup>8</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future* (MIT Press, 2000), 135.

<sup>9</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 65.

<sup>10</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future* (MIT Press, 2000), 138.

<sup>11</sup> Alex Ashbourne, “Opening the US Defense Market, *Centre for European Reform*, October 2000, 1.

<sup>12</sup> John Weston, “The European Defence Industry in the Global Market, 1.

<sup>13</sup> John L. Less, “The Souring of the Defense Industry: US European Competition, *Foreign Observer*, November 1997, 1.

<sup>14</sup> Gordon Adams, “The Transatlantic Defence Market and ‘Fortress America’: Obstacles and Opportunities,” Western European Union, 22 November 2000, 6.

<sup>15</sup> Ibid, 5

## Notes

<sup>16</sup> Ibid, 5.

<sup>17</sup> Confirmation Hearing on Nomination of Donald Rumsfeld as Secretary of Defense before the Senate Armed Services Committee, Jan 2001.

<sup>18</sup> James Canan, “Globalization: The DSB Speaks Out,” *Aerospace America*, July 2000, 34-36

<sup>19</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future* (MIT Press, 2000), 130

<sup>20</sup> James Canan, “Globalization: The DSB Speaks Out,” *Aerospace America*, July 2000, 35.

<sup>21</sup> Ibid, 40.

<sup>22</sup> Gordon Adams, “The Transatlantic Defence Market and ‘Fortress America’: Obstacles and Opportunities,” *Western Europe Union*, 22 November 2000.

<sup>23</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 2.

## **Chapter 3**

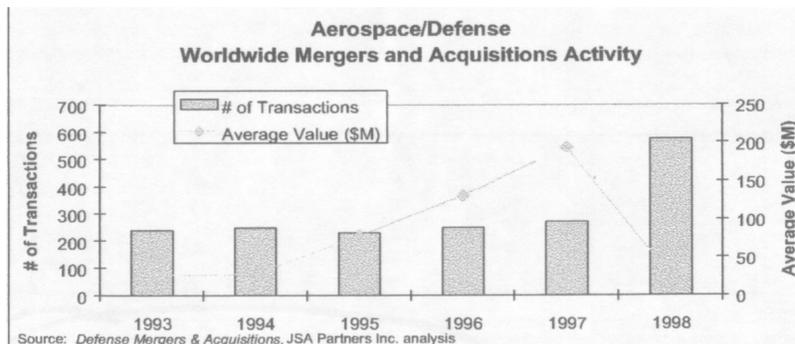
### **Current Structure**

#### **United States**

Dramatic cutbacks in US defense investments, the changing security environment, and the evolving nature of globalization have led to fundamental shifts in the military and industrial and technology base. The decline in spending resulted in greater competition for fewer contracts with smaller production runs and fewer new starts. The more competitive environment in turn prompted a major contraction in the defense industrial base. Seeing their market shrivel, many US defense companies sought alternative means of maintaining the volume of business necessary to survive.

Many companies such as GTE, Lucent, Hughes, Magnavox, TI, IBM, Eaton, GE, AT&T, Unisys, Honeywell, Westinghouse, Tenneco, Ford, Chrysler, Teledyne, and Goodyear chose to exit the defense market entirely.<sup>1</sup> Others have been slowly disinvesting in their defense and space assets. For example, GM Hughes Electronics sold Hughes Aircraft to Raytheon and their world-leading commercial satellite business to Boeing. Instead, GM Hughes is now focusing on the higher growth/higher return businesses of satellite services such as DirecTV, DirecPC, Spaceway, Pan Am Sat and network services.<sup>2</sup>

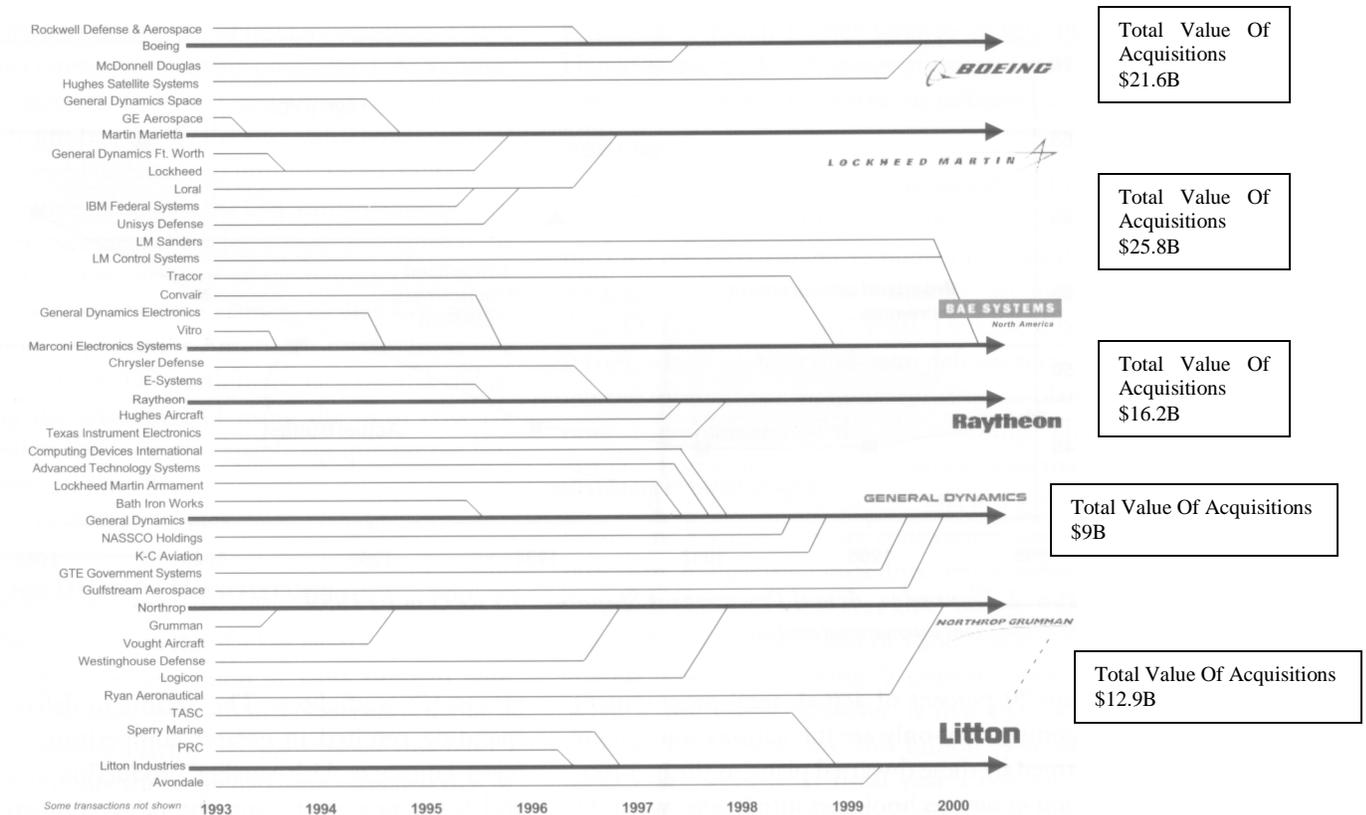
Others downsized to match reduced demand, streamlined processes, increased productivity, and revamped supplier relationships. Many began a process of consolidation. Indeed, DoD encouraged consolidation early in the Clinton Administration. At the now famous “Last Supper” in 1993, then Secretary of Defense, Les Aspin, and his deputy, William Perry, acknowledged the impact of budget reduction on the defense industrial base. In fact, the SECDEF stated explicitly that he hoped “several aircraft firms would disappear through mergers as well as three of the five satellite firms in business then, and one of three missile companies.”<sup>3</sup> Industry responded via a furious pace of mergers and acquisitions.



**Figure 7: Merger & Acquisition Activity**

**Source:** Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2000, 7.

Combinations of almost 30 once-independent companies have formed five of the largest US defense companies--Boeing, Litton, Lockheed Martin, Northrop Grumman, Raytheon, and General Dynamics--over the past 10 years.



*In the past decade, 25 defense contractors have consolidated into just five: Lockheed Martin, Boeing, Raytheon, Northrop Grumman and General Dynamics. In 41 deals, acquirers paid \$72 billion for Companies with \$81 billion in sales.*

**Figure 8: Defense Industrial Consolidation, 1993-2000**

**Source:** AIAA Defense Reform 2001, “A Blueprint for Action: Setting the Stage,” February 2001, 4.

The shakedown also affected the second and third tiers of defense industry. Suppliers have decreased by about half since 1993, from 85 to 44, as they sought to improve both capabilities and market penetration.<sup>4</sup> Further consolidation at the lower tiers, however, is still necessary as many are too small to provide critical mass necessary for innovation.

Technological innovations necessary to aid the revolution in military affairs has also influenced the manner in which defense industry has consolidated. While overall defense spending was declining, the complexity and cost of high-tech weapons needed to

maintain the technological advantage was increasing. Advances in micro circuitry and electro-optics, although enhancing performance and lethality, require more complex, and more highly integrated platforms. This, in turn, has altered the value-added chain in production. Whereas “metal-bending” was the most lucrative stage in manufacturing twenty years ago, today, the “systems integration” stage adds the most value. For example, nearly half of the final costs of today’s combat aircraft come from the avionics, sensor, fire control and weapons system, components that barely comprised 20% decades ago.<sup>5</sup> By becoming vertically integrated, defense companies can capture the value-added work at the systems and subsystems stages of production. The resulting structure of defense industries reflects an attempt to capture a greater share of this systems-integration business.

Compared to European industry, US defense firms are highly integrated, both vertically and horizontally. Lockheed Martin, Northrop Grumman, and Boeing are all integrated prime contractors with electronics management and other critical sub-tier capabilities. Additionally, the number of firms has dropped to 5 manufacturers of aircraft and helicopters and 5 missile manufacturers compared to Europe’s 10 aircraft and 11 missile manufacturers.<sup>6</sup>

### **Competition**

Despite significant restructuring and consolidation, there is still competition in major military platforms. (see Figure 8) Not surprisingly, several firms have developed a considerable defense market presence in multiple product areas. Boeing, for instance, produces platforms in 6 of the 10 areas, as does Lockheed Martin in 5 and General Dynamics in 3.

**Figure 9: U.S. Contractor Presence for Selected US Military Platforms**

| Platform                  | Companies*<br>(1990) | Companies*<br>(2000) |
|---------------------------|----------------------|----------------------|
| Fixed-wing Aircraft       | 8                    | 3                    |
| Launch Vehicles           | 6                    | 3                    |
| Rotorcraft                | 4                    | 3                    |
| Satellites                | 8                    | 6                    |
| Strategic Missiles        | 3                    | 2                    |
| Submarines                | 2                    | 2                    |
| Surface Ships             | 8                    | 3                    |
| Tactical Missiles         | 13                   | 3                    |
| Tactical Wheeled Vehicles | 6                    | 3                    |
| Tracked Combat Vehicles   | 3                    | 2                    |

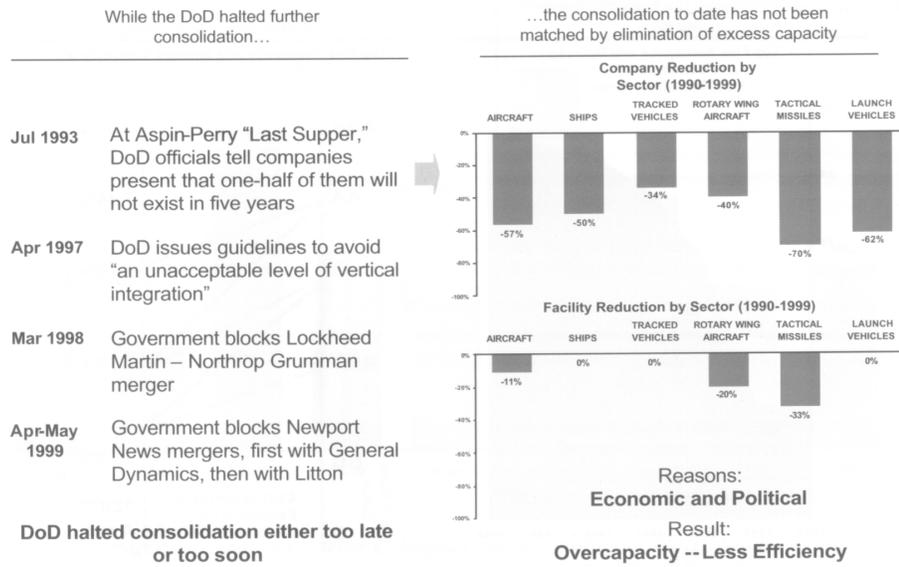
\*Companies producing platforms in stated year. Not all produce all classes of platforms within a given platform area.

**Source:** Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 11.

The US defense industry consolidations have resulted in significant cost savings. While efficiencies could have been greater if firms had taken additional steps to rationalize and streamline facilities, many transactions evidenced sizable cost savings. The 5 largest US defense contractors combined have taken \$9B out of their cost base in the past 3 yrs, which followed aggressive rationalization of redundant capabilities and excess capacity.<sup>7</sup> DoD's most recent report on external restructuring costs indicates that gross savings exceed \$4.4B and net savings to DoD exceed \$3.8 B.<sup>8</sup> Despite the wave of mergers and acquisitions in the last few years, the process of consolidation has not yet reached a rational end-state.

## Rationalization

According to the Pentagon's "Annual Industrial Capabilities report to Congress", Jan 2001, significant overcapacity in key sectors still burdens the defense industry. Although

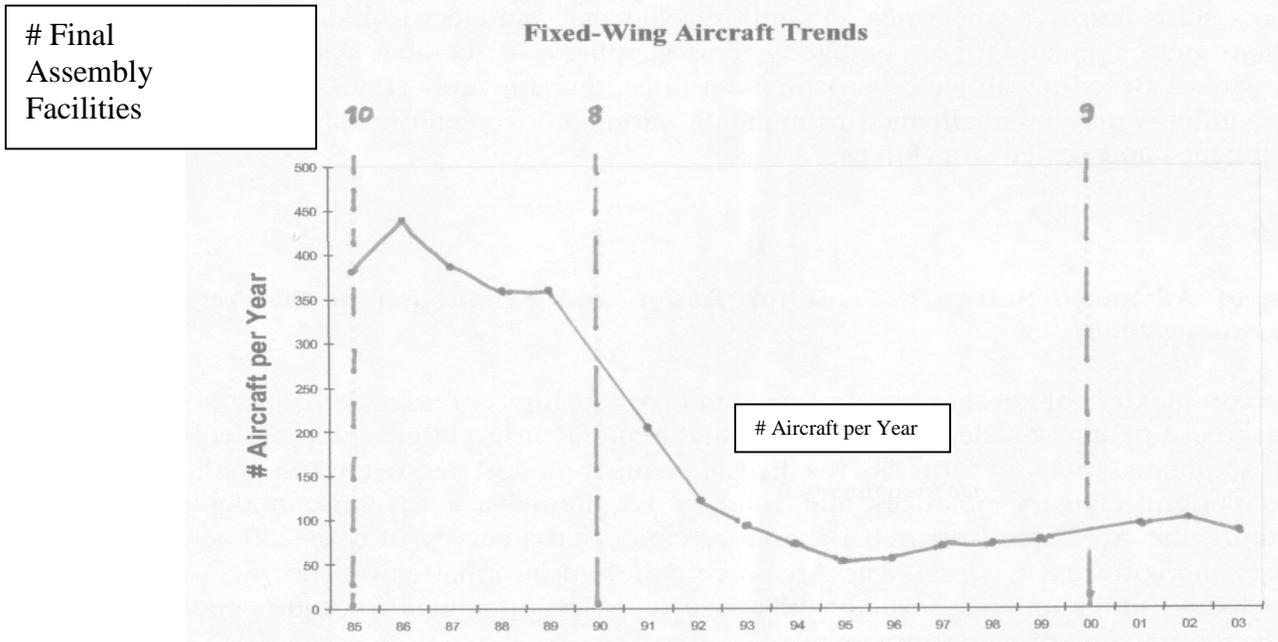


**Figure 10 Mismatch in Decline of Producers vs. Decline in Facilities**

**Source:** AIAA Defense Reform 2001, "A Blueprint for Action: Setting the Stage, Jan 2001, 5.

DoD has no mechanism in place to track underutilized plant capacity (facilities, equipment, and manpower) across the entire defense industry, recent DoD-sponsored studies indicate restructuring has not kept pace with demand. Most major defense platform designers and producers are operating at less than 50% capacity utilization, and process specific technologies are even lower (e.g., machining capacity was found to be operating at less than 10% industry wide). Results show, for example, the fixed-wing aircraft, solid rocket motor, satellite, and shipbuilding industries, and Army-owned ammunition plants, have retained significant underutilized capacity. The Fixed-wing Aircraft Study showed that the industry employs only one fewer fixed-wing final

assembly facility than it did in 1985 even though DoD is buying significantly fewer. And even though the number of companies producing fixed-wing aircraft decreased from 8 to 3, this was the result of mergers and not due to the closure of any of the original 8 production lines.



**Figure 11: Fixed-wing Aircraft Study**

**Source:** Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 15.

In the solid rocket motor business, 5 firms that accounted for industry revenues of \$2.5 B in 1991 still remain in business, even though industry revenue has declined to almost \$1B. Likewise, the Space Industrial Base Study in December 2000 concluded that the US space industry has significant underutilized capacity. Between 2000 and 2015, the industry is expected to experience an average capacity utilization of 47% for large satellites buses, 48% for medium buses, and about 80% for small buses.<sup>9</sup> The report concludes that low returns and inefficiency resulting from such overcapacity could cause

primes to exit the business before 2015. Another sector burdened by excess capacity is the Navy shipbuilding industry, which operates at 50% capability. For the past ten years, the Navy has relied on six major shipyards to provide the design and construction capabilities for its surface and submarine force shipbuilding requirements. With the post-Cold War downsizing (550 ships to about 300) and inability to compete for international commercial work, the yards have reduced their workforces significantly but not their facilities. Finally, the Ordnance Activities Rightsizing Study conducted by RAND concluded that Army arsenals and Army-owned ammunition plants also have significant underutilized capacity.<sup>10</sup>

Sustaining underutilized capacity of many of these manufacturing facilities costs hundreds of millions of dollars annually in overhead costs allocated to DoD programs. Archaic government cost accounting practices encourage the maintenance of more plants and equipment than are necessary by limiting the amount of savings companies can realize from closing facilities. Current rules requiring companies to surrender more than 80% of savings from consolidation or reduction in excess capacity are a disincentive to the industry, say Jay Korman, analyst at DFI International.<sup>11</sup> Defense companies have little economic incentive to shut down plants, and then endure political criticism when facilities are closed and employees are laid off. Such lack of incentives combined with Congressional reluctance to allow closure of defense facilities has been traditional barriers to further streamlining.

## **Europe**

Compared to American counterparts, European defense firms are not as highly integrated, either vertically or horizontally. European consolidation is a slow process that

is far more complex than in US. Many European companies were partly or wholly government-owned while US companies were already private and subject to Wall Street expectations. European consolidation had to cross national borders each with its own legal, regulatory, and political systems while American firms were working within borders of a single nation. Also, because defense industries are symbolic of national sovereignty and state pride, cross-border consolidation and the resulting work force reductions were more challenging. The increasing pressures of spiraling R&D costs, deteriorating national economies of scale, and deficit reduction goals for monetary union contribute to the economic rationale for more coordinated procurement and research policies and dictate the need for intra-European defense cooperation.<sup>12</sup> Governments and industry in the EU are moving, albeit slowly, from a culture of fragmentation to one of integration.

In the United Kingdom, defense industry is private and a number of mergers and acquisitions have occurred. Like the US, British companies value competition, exports to the global market, and a liberalized investment and regulatory climate. Even before the end of the Cold War, the shrinking of defense budgets led the UK government to introduce more commercial discipline into armaments procurements. Defense firms focused on greater efficiency, helped by new manufacturing processes and by developing less adversarial relationships between prime and subcontractors. In France, defense industry is more fragmented, with substantial portions still in government hands and experiencing recapitalization, privatization, and heavy rationalization all at the same time. It didn't take steps towards consolidation until early '99. Germany, is vertically integrated and privately owned but in early stages of rationalization. Restructuring has

primarily occurred in aerospace sector. In '95 Deutsche Aerospace became Daimler-Benz Aerospace, which includes about 80% of German industrial capabilities in aerospace. In Italy, the industry is vertically integrated and state owned. By 95 Finmeccanica had gained control of about ¾ of Italian defense industry, including Italy's major helicopter manufacturer Agusta and aircraft manufacturer Alenia.<sup>13</sup>

Construction of a transatlantic "industrial bridge" is underway and accelerating. Cross border (US-Europe and intra-European) merger activity has increased each year since 1992 and trend is expected to continue. Since 1996 cross-border transactions have increased in number, in value, and as a percentage of overall mergers and acquisitions.<sup>14</sup> US commercial companies routinely develop products on a multinational basis, draw on suppliers based overseas, and sell components and sub-systems to high-tech firms abroad.

As a byproduct of consolidation and globalization, both US and European defense firms are now establishing or increasing their presence in the others' market areas. A recent survey by KPMG Corporate Finance found US firms invested \$154 billion in '99 for mergers and acquisitions outside the US (up from \$22B in '90). Boeing, General Dynamics (GD), LM, Raytheon, and Northrop Grumman have subsidiaries in the UK. GD also has subsidiaries in Italy and owns a portion of Steyr in Austria. Boeing owns 35% of Aero Vodochody (Czech Republic). However, TRW Aero Systems is the only US supplier with a large production and market presence in several locations in Europe – not just in the UK—primarily due to its acquisition of Lucas Varity (UK).<sup>15</sup>

European companies are entering the larger US defense market by acquiring US firms. According to same KPMG Corporate Finance survey, cross-border merger and acquisition investments in the US increased from \$54B in 1990 to \$293B in 1999.<sup>16</sup>

Rolls-Royce (RR), Thales Group, BAE, and EADS are among the few companies active in the US. One area Europe has been able to penetrate is the engine sector, partly because engine technology is less sensitive than other defense technologies and partly, because it's an area in which US is not vastly superior to Europe. Transatlantic links date back to '74 when GE allied itself with the French firm, Snecma. In response, RR teamed with Pratt & Whitney (P&W). P&W has also partnered with German engine-maker MTU. RR's takeover of Allison in '95 is probably best example of effective European penetration of a US defense market. RR realized the need to build businesses in the US in order to succeed there and was willing to pay a premium for the company. The takeover sparked a creation of unprecedented security requirements over classified technology and unclassified export-controlled technology. In response DoD lifted the proxy board requirement for Allison last year and replaced it with a more flexible Special Security Agreement (SSA).

The French company Thales Group, formerly Thomson-CSF, has been active in US market since mid-80's when it won a contract to supply a radio network to US Army. Thales is currently #4 in world in defense electronics and to retain that position, it needs access to US market. Thales' current strategy is to create teaming arrangements with American firms on cooperative programs rather than trying to merge with them although its takeover of the British company, Racal, also improves its standing in the US. Thales now runs over 40 defense trans-Atlantic programs.<sup>17</sup> It tends to link with small companies in need of its technologies but perhaps most successful partnership is with Raytheon. Their recently announced worldwide joint venture encompasses air defense/command and control centers and ground-based air surveillance and weapons-

locating radars. The new enterprise, Thales Raytheon Systems, will have about 1,300 employees and \$500-600M annual revenues.

BAE SYSTEMS has established a significant US presence over the past 10 years via a series of mergers and acquisitions. In Jan 1999 British Aerospace (renamed BAE SYSTEMS in Dec'99) acquired Marconi Electronic Systems. This move disappointed other European defense companies, particularly DASA, who believed they were on verge of securing a deal. Prime Minister Tony Blair had indicated that he, like DASA, would have preferred a European, rather than a national merger, yet BAE decided to followed its own course. This highlighted the fact that defense industry restructuring in Europe is led predominantly by industry rather than by governments. Of significant importance, BAE's takeover of Marconi Electronic Systems gained Tracor, a medium sized electronics firm acquired by GEC-Marconi in '97 and to date the largest European acquisition in the US.<sup>18</sup> In 2000 BAE further increased its presence in US. In Apr 00 BAE purchased Lockheed Martin (LM) Control Systems, a division that produces flight controls for Boeing C-17 among other aircraft, for \$510 M cash, and in July it announced a \$1.67B acquisition of LM Aerospace Electronic Systems, (formerly Sanders; the Fairchild Systems; and Space Electronics & Communication) which supplies parts for the highly sensitive F-22 fighter. The implications of foreign ownership and management of a unique US industrial base asset, such as electronic warfare technology, have yet to be seen. As a result, BAE now has over 18,000 employees in the US and annual revenues of \$2.4B.<sup>19</sup> Such significant presence stands BAE in good stead for future teaming arrangements with American firms, such as Boeing.

In July 2000 Aerospatiale Matra (France), DASA Aerospace (Germany), and Construcciones Aeronauticas SA (Spain) merged their operations into one entity—the European Aeronautic Defence & Space Co (EADS). The new group has an important toe-hold in the Spanish market due to an earlier tie-up with DASA (formerly a unit of DaimlerChrysler) and Construcciones Aeronauticas SA and in Apr '00 signed a joint venture deal with Alenia Aerospazia (Italy). EADS, with annual revenues of about \$33B ranks among the world's largest aerospace and defense companies. EADS includes Airbus Industrie as well as defense and space operations and effectively, the new European counterpart to Boeing and strong competitor to Boeing's commercial and military aero operations.<sup>20</sup> The consolidation should facilitate the planned restructuring of Airbus Industrie and launch of its new super jumbo jet. EADS recently agreed to a strategic alliance with Northrop Grumman, covering surveillance and reconnaissance equipment and continues to look for opportunities to partner with US firms in both military and commercial markets. EADS, however, is a prime example of Europe's continued fragmentation. Although the governments of Germany, France, and Spain drove the merger that created the company, their militaries continue to order weapon independently. That notwithstanding, collectively, EADS and BAE Systems will account for almost 75% of all European defense and aerospace prime contracts.

In addition to a number of joint ventures (Eurofighter, Astrium) linking these two giants together, EADS and BAE recently announced plans to combine with Italy's Finmeccanica SpA and form a new joint missile company, MBDA. MBD stands for Matra BAe Dynamics and A stands for both Alenia Marconi Systems (owned by Finmeccanica and BAE) and Aerospatiale Matra. This new company will be a

formidable competitor in the global missile market with expected annual sales of \$2.4B, second only to Raytheon. This new missile group will be a significant force in lobbying European governments to choose European instead of American missile systems, according to some defense industry analysts.<sup>21</sup> MBDA's need to operate in different countries will influence European governments to ease legal and trade barriers to intra-European sharing of technology. BAE and EADS are undoubtedly on a path that will rival major US prime defense contractors in sales and breadth of product offerings.

European companies want not only to be able to “compete” but also be able to “cooperate” with the US. Cooperative development programs such as Joint Strike Fighter (JSF), Medium Extended Air Defense System (MEADS), and Multifunctional Information Distribution System (MIDS) offer genuine opportunities to share costs, leverage technology, strengthen political military ties, and enhance coalition interoperability.<sup>22</sup> The \$200B JSF program, for instance, is the largest cooperative development program in which the US has ever been involved and has international participation at four levels. So far, Britain, the only full “collaborative partner,” can influence requirements and have access to sensitive technologies, and has promised an investment of about \$2B for Engineering Manufacturing Development (EMD). Norway, Denmark, Netherlands, and Italy are expected to join in at the 4% investment level when the program enters EMD. Unfortunately, government-to-government collaboration has dwindled to a handful of joint programs, all with uncertain futures. Fortunately, the decline of joint programs has not meant a decrease in transatlantic ties as numerous partnerships and joint ventures are underway.

As consolidation and globalization spread on both sides of the Atlantic, the longstanding government ownership of major European defense firms appears to be decreasing. For example, 32% of the French company Thales is publicly traded; the company hopes to increase that to 46%. Additionally, 35% of EADS is publicly held. Nevertheless, government ownership of major European defense firms continues, and such ownership encourages political input into major corporate strategies. The French government owns 97% of SNECMA and 34% of Thales. The Spanish government owns 100% of both Bazan SA and E.N. Santa Barbara, and the Italian government owns 55% of Finmeccanica SpA.<sup>23</sup>

Similar to the US, Europe will likely continue restructuring. Smaller defense firms in Europe face considerable economic and shareholder pressures to join, or align themselves via supplier agreements, with one of the larger industrial groupings. As part of the post-merger integration process, large European aerospace prime contractors are reducing the number of their suppliers and asking the remaining vendors to absorb more development risk and cost and offer more integrated systems than in the past.<sup>24</sup> These factors are spurring a new wave of consolidation as companies below the platform prime contract level seek to reach a critical mass and become the dominant supplier in their particular technology niche.

Merged European firms now are faced with many of the same difficulties of managing transitions successfully and achieving the desired industrial rationalization as their US counterparts. Successful mergers are difficult even if done within national boundaries. The additional political, regulatory, economic and other circumstances that exist in Europe make the task that much more complex. Furthermore, as government

shareholding in defense firms decline and public ownership increases, they'll face additional pressures to produce bottom-line results. How Europe deals with the challenges in achieving the desired synergies and efficiencies will determine what 'model' for European defense companies emerges and will undoubtedly have important implications for defense policy.

### Notes

<sup>1</sup> Defense Science Board Task Force, *Preserving a Healthy and Competitive US Defense Industry*, 2000.

<sup>2</sup> Booz-Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 7.

<sup>3</sup> Gerald I Susman and Sean O'Keefe, ed., *The Defense Industry in The Post-Cold War Era, Corporate Strategies and Public Policy Perspectives* (Elsevier Science Ltd., Oxford, UK, 1998), 142.

<sup>4</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future*, (MIT Press, 2000), 138.

<sup>5</sup> CSIS Senior Policy Panel on the US Defense Industrial Base, *Defense Restructuring and the Future of the US Defense Industrial Base*, Center for Strategic and International Studies, Washington D.C., 1998, 15.

<sup>6</sup> "The Course of Defense Industrial Consolidation: Cooperation or Consolidation? Defense Industrial Dilemmas for NATO Governments. NATO Academic Forum Conference: America and Europe: A Time for Unity, A Time for Vision, February 1997, 5.

<sup>7</sup> Booz-Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, December 2000, 7.

<sup>8</sup> Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 3.

<sup>9</sup> Booz-Allen & Hamilton, *Space Industrial Base Study*, December 2000, 28-29.

<sup>10</sup> Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 15.

<sup>11</sup> Gopal Ratman, "Industry Consolidates But Factories Stay Open," *Defense News*, January 29, 2001, 2.

<sup>12</sup> "The Course of Defense Industrial Consolidation: Cooperation or Consolidation?" NATO Academic Forum Conference: America and Europe: A Time for Unity, A Time for Vision, February 1997, 5.

<sup>13</sup> General Accounting Office, *Defense Trade: European Initiatives to Integrate the Defense Market*, GAO/NSIAD-98-6, (Washington DC: GAO, 1999), 9.

<sup>14</sup> Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 27

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<sup>15</sup> Ibid, 28.

<sup>16</sup> Ibid, 28.

<sup>17</sup> Ibid, 5.

<sup>18</sup> Alex Ashbourne, "Opening the US Defence Market," *Centre for European Reform*, October 2000, 4.

<sup>19</sup> Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 29.

<sup>20</sup> Ibid, 27.

<sup>21</sup> Gopal Ratman, "European Giants Pool Efforts in Missile Market," *Defense News*, March 26, 2001, 1.

<sup>22</sup> Ibid, 25.

<sup>23</sup> Ibid, 29.

<sup>24</sup> Ibid, 10.

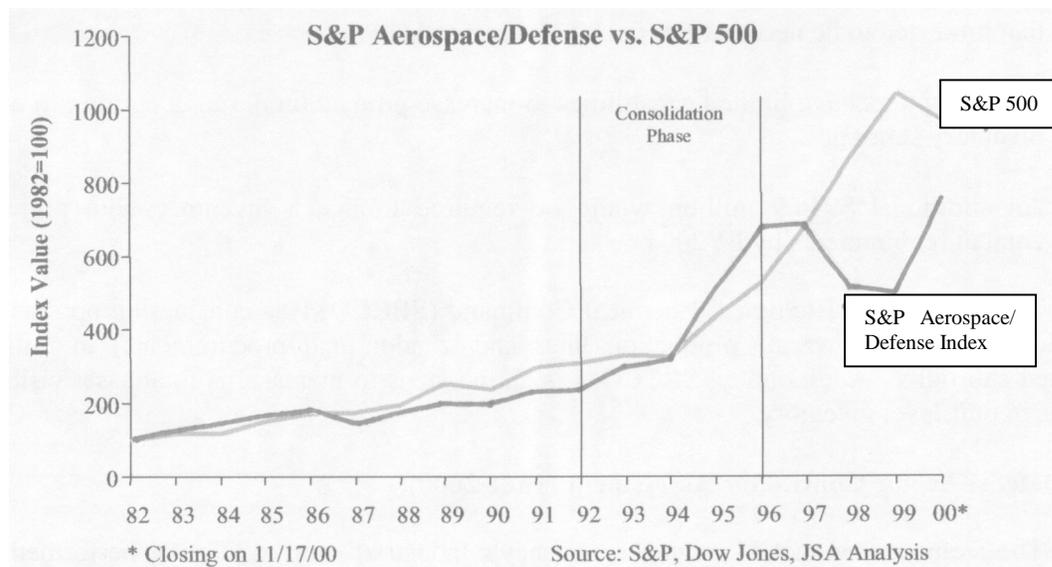
## Chapter 4

### Financial Assessment

Is the defense industry experiencing a financial crisis as some observers have suggested? In an era of industrial consolidation, DoD's central focus is to ensure that "the defense industry is financially stable, efficient, competitive and hence, capable of providing affordable, high quality, and innovative defense products to meet national security needs in the 21st century."<sup>1</sup> Problems on specific programs, reduced earning estimates, and plummeting prices of certain US defense stocks led some observers to question the overall health, structure, and competitiveness of the US defense industry. DOD sponsored several studies to assess the health of the defense industry. One metric in assessing its health is performance in financial markets. DoD is primarily budget driven and manages its programs by monitoring performance against cost, schedule, and capability specs. Industry, by contrast, is price driven and used a variety of metrics, such as stock price appreciation, profit margin, etc, to evaluate financial performance. But why should the government care about stock prices or the valuations given to defense companies? Stock prices matter because they reflect a company's performance and affect its ability to raise capital through borrowing or equity offerings. Without investors willing to buy the debt and equity issued by firms that merged with others, consolidation in the defense sector would not have been possible. Stock price is also a factor in the

decision of some companies to sell their defense businesses entirely, and more importantly, has serious implications for a firm’s ability to recruit and retain talented employees. Finally, access to capital plays a key role in being able to develop innovative technologies for weapons the military needs to win quickly and decisively.<sup>2</sup>

Historically, the aerospace/defense industry historically has under-performed the S&P 500, Dow Jones Industrials, and S&P Industrial indices (see Figure 12) The market indices are indicators of aggregate price appreciation and reflect the increase in value of the component companies. From 1983-99 the defense industry’s aggregate value increased 400% while S&P500 increased over 800%. During 1994-96, the defense industry actually outperformed the other three indices, supported by increased free cash flows from acquisitions and mergers.<sup>3</sup> The indices, although not a direct indicator of the industry’s ability to deliver low cost, high quality products, do reflect the sector’s relative financial performance since market prices generally are based on factors such as growth, stability of earnings, and cash flows.



**Figure 12: S&P Aero/Defense vs. S&P 500**

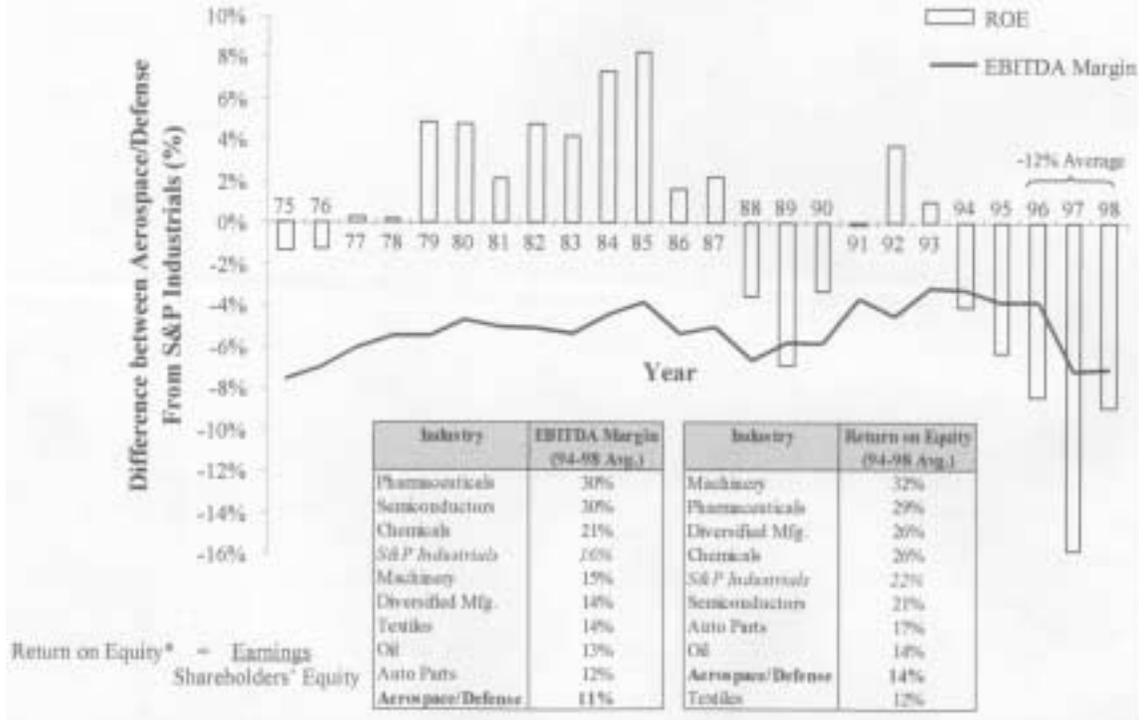
**Source:** Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 19.

2000 was a particularly volatile year for the stock market in general, and the defense industry, specifically. Early in the year, major market indices continued to increase dramatically as capital flowed to commercial high tech and internet equities at the expense of traditional “value-based” offerings that derive their value from steady rather than exceptional growth. However, the trend reversed and there was a flight to “value” stock, including those of defense firms. Beginning in March ‘00, aerospace/defense stocks began to rise and by November had appreciated over 70%. This event coupled with the improved financial performance of defense firms resulted in increased sector stock prices, though valuations still lag behind those of the average S&P industrials.<sup>4</sup>

The aerospace/defense sector has also not kept pace with the overall improvement in operating margins of other manufacturing sectors. The ratio of aerospace/defense industry earnings before interest, taxes and non-cash deductions to total sales (EBITDA margin) has historically lagged the S&P industrial average by about 6%, despite healthy and increasing EBITDA throughout the period of consolidations.<sup>5</sup> (see Figure 13)

## Aerospace/Defense Financial Performance vs. S&P Industrials, 1975-1999

Over the past 25 years, Aerospace/Defense profit margins have been consistently low; however, ROE\* appeared relatively strong until 1987.

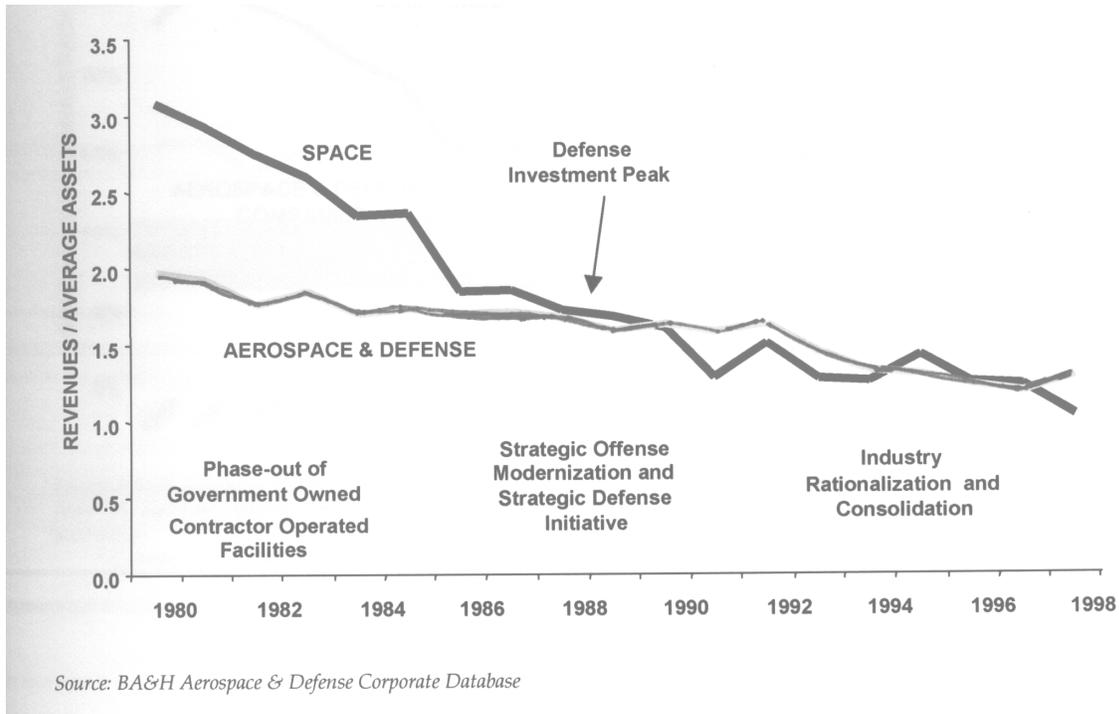


**Figure 13: Aero/Defense Financial Performance vs. S&P**

**Source:** Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 19.

Overall and compared to other industries, the aerospace and defense industry earns below average Return On Assets (ROA) and Return On Equity (ROE). ROE has significantly lagged behind that of the S&P industrials in recent years. This low ROE is partly due to the remarkable performance of non-defense industrials during this period, which drove the index up, but also largely due to reduced profitability and the excessive payments for acquisitions.<sup>6</sup> Profitability has been declining since 1980 with a recent increase since '99. The current profitability for some segments such as space is 1/5 the historical peak. The overall industry's ROA is 1/2 what it was in the 1980s and fails to

exceed the cost of capital.<sup>7</sup> This is a cause for concern since the continued financial viability of the defense industry depends on promising investors a return on their capital that is higher than the cost of capital.

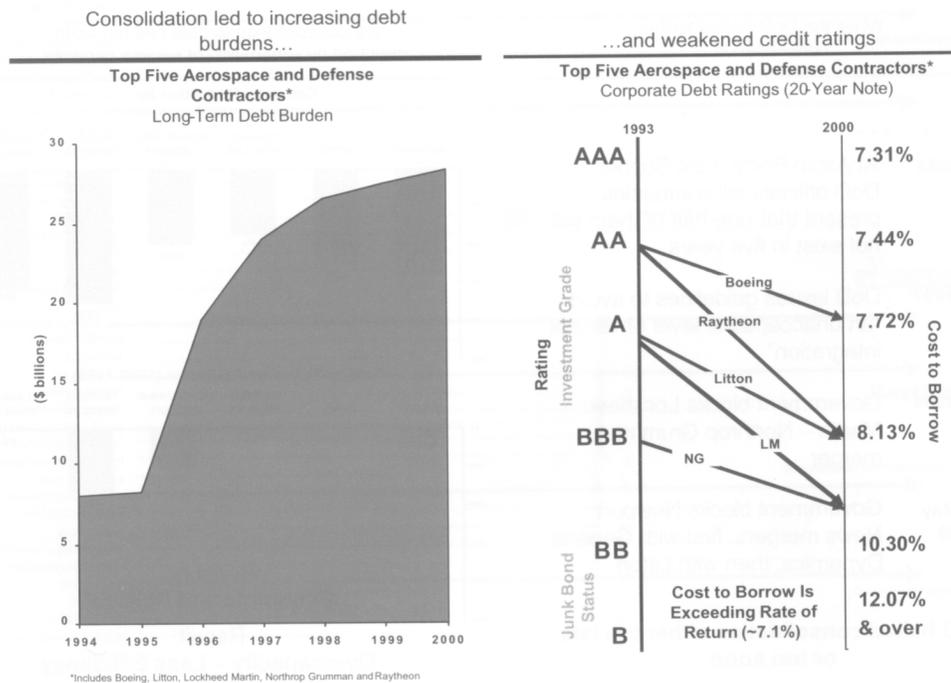


**Figure 14: Asset Turnover Trends for Aero/Defense Industry**

**Source:** Booz Allen & Hamilton, *Space Industrial Base Study*, 2000, 14.

Historically, the aero/defense sector operated with a lower debt (relative to assets) than did S&P industrial firms. As a result of acquisitions often paid for with borrowed cash, the sector has become debt-heavy. The increased debt load, though concentrated in a few large firms, added to investors' existing anxieties about the negative outlook for government sales. Amid shrinking revenues and declining backlogs, industry's profitability and attractiveness to investors declined rapidly. As industry's long-term debt burden increased from under \$10B in 1995 to over \$25B in 2000, some company's debt ratings approached those of junk bonds.<sup>8</sup> Their weakened credit-worthiness, in turn,

increased some companies' cost of borrowing capital to a higher level than their prospective rate of return—an untenable situation. All this took a toll on stock prices, further increasing the cost of capital. By the end of the '90s, the defense industry's average rate of return fell well below those of many other industries. Faced with an inability to invest in new ventures and smaller investments in new technology development, defense industry increasingly fell behind. All this occurred during a rampant bull market that carried NASDAQ to 5.5X and S&P 500 stocks to over 3X the '96 levels.<sup>9</sup>



**Figure 15 Corporate Debt Loads and Weakening Credit Ratings Among Top Five US Aerospace and Defense Contractors**

**Source:** AIAA Defense Reform 2001, *A Blueprint for Action: Setting the Stage*, 2001, 16.

Another gauge of the health of the industry is its ability to provide affordable, high quality, and innovative products that meet our national security needs in the 21<sup>st</sup> century.

Competition is essential in defense markets to both decrease costs and spur innovation. Innovation is critical in a world where technical superiority on battlefield provides our military advantage. Given that defense industry has become so highly concentrated, it's important to ask if consolidation has gone too far and how does DOD ensure competition for the future.

Recent DSB studies have found that the presence of a sufficient number of capable competitors in core defense markets will foster both competition and innovation vital to superior warfighting. Today, two or more competitors exist in most important defense product markets. In many markets, firms compete in both EMD and Manufacturing Development/Production phases of a program, and in others, firms have a continuing but lesser presence (i.e. R&D, aftermarket support, etc) that may still enable them to compete in DoD programs.<sup>10</sup> The ability of US firms to innovate is also second to none. The successful development of the F-22 with new technology such as super cruise propulsion, active electronically scanned array radar, and improved, more durable stealth capabilities is just one example of their tremendous technological achievements.

In sum, there is no clear indication today that US defense industry consolidation of the '90s has produced an industry in crisis. Many defense firms are still adjusting to their acquisitions of recent years. In many ways, the problems the firms have encountered are typical of problems in any consolidation industry. Successfully absorbing acquired businesses is a complex process involving restructuring management, facilities, and personnel, and dealing with the inevitable dislocations and debt burdens resulting from significant acquisitions. Lackluster financial performance and only modest prospects for increased defense modernization funding further weakened investor

interest and depressed market values. The combination of declining revenues and increased debt burdens significantly tightened profit margins for some firms and adversely affected firms' bond ratings and the cost of capital.<sup>11</sup> During 2000, however, defense stocks saw a significant appreciation (over 70%), particularly as compared to the technology sectors, which fell off previously inflated values.<sup>12</sup> Although defense companies' financial positions appear to be improving, the industry, nonetheless, is still not assured of the stable outlook, profitability, and level of investor confidence it once had consistently. Collectively, these developments are a wake-up call for the industry and the customer. As in other consolidation industries, US defense firms will work through these issues. They are continuing to streamline their operations, shedding non-core assets as appropriate and improving cash flow needed for financial stability and investment. Having several capable firms in each major product area and a viable supplier chain to support them will ensure adequate competition and innovation. The ongoing challenge will be to maintain competition in the context of relatively flat future defense procurement budgets. For both economic and national security reasons, industry and government must work cooperatively to create a healthier environment and a more stable industrial base.

### Notes

<sup>1</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 30.

<sup>2</sup> Booz-Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 28.

<sup>3</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001,

<sup>4</sup> Ibid, 19.

<sup>5</sup> Ibid, 19-20

<sup>6</sup> Ibid, 20.

## Notes

<sup>7</sup> Booz Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 3.

<sup>8</sup> AIAA Defense Reform 2001, *A Blueprint for Action: Setting the Stage*,” 2001, 5.

<sup>9</sup> Booz Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 4.

<sup>10</sup> Department of Defense. *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 31.

<sup>11</sup> AIAA Defense Reform 2001, *A Blueprint for Action: Setting the Stage*,” 2001, 6.

<sup>12</sup> Booz Allen & Hamilton, *US Defense Industry Under Siege—An Agenda for Change*, 2000, 17.

## **Chapter 5**

### **How is Acquisition System Responding?**

The policies of the US Government toward its defense suppliers have not kept up with the dramatic changes in the international and technological environments in which US defense forces must operate. DoD policy is to allow, to the maximum extent practicable, competitive market forces to shape the industrial environment that supports the defense strategy. Thus, while defense industry faces some long-term challenges, there is no need for extraordinary government intervention. With some focused adjustments in industrial policy, DoD can establish an enabling framework in which defense firms can flourish and supply affordable and innovate products. There are six critical areas that demand attention:

- Maintaining competition
- Industrial rationalization
- Budgeting and financial stability
- Accessing commercial technology
- Sustaining intellectual capabilities needed for future innovation
- Globalization and export control reform

#### **Maintaining Competition**

In an era of defense industrial consolidation both in the US and in Europe, the challenge is to ensure competition. Competition produces efficiencies that improve affordability and stimulates innovation. To address the challenge of maintaining future

competition DoD focuses on two key areas: first, mergers and acquisitions and second, the defense procurement process.

### **Mergers and Acquisitions:**

In reviewing mergers, DoD focuses both on the benefits/cost savings to DoD as a result of the combination and also the potential adverse affects on competition. DoD's basic standards have not changed over time, although DoD has recently become more involved in antitrust reviews by sharing information and working more closely with the Department of Justice antitrust division and the Federal Trade Commission.

While established procedures are applied, there is no one size fits all approach. DoD rigorously assesses proposed mergers on a case-by case. DoD supports supplier rationalization that eliminates excess capacity, reduces costs, sustains critical mass in R&D to foster innovation, and provides better value for DoD and the US taxpayer. It also weighs the potential adverse effects on competition. In the early '90's industrial base management policies encouraged consolidation among large defense firms. The SECDEF's "Last Supper" meeting at the Pentagon with industry CEOs, in which he encouraged defense industry to merge, served as a catalyst for consolidation. Given the relatively large number of competitors for shrinking defense programs and budgets, antitrust authorities demonstrated a high degree of flexibility in their reviews. Some suggested consolidation had gone too far and domestic competition was at risk. A 1997 DSB Study cautioned on the extent of vertical integration in the US defense industry and the corresponding need to improve DoD's ability to recognize problems that may arise from vertical integration in the future. Indeed, in 1998 DoD reversed course and expressed concern over the extent of consolidation and renewed its intent to scrutinize

proposed mergers more closely. DoD denied approval of a planned merger of Lockheed Martin and Northrop Grumman, and also refused to approve the acquisition of Newport News Shipbuilding by two different bidders because of apprehension over sheer size of prospective companies and the leverage they might exert on DoD, as well as possible adverse effects on competition resulting from the vertical integration of primary contractors and some of their suppliers. Furthermore, DoD officials indicated they no longer believed that it would be a good idea for US and Western European defense companies to merge, bringing to an end what had been preliminary discussions for major combinations across the Atlantic. While DoD approved some mergers and acquisitions since these denials, such as Boeing's purchase of Hughes Satellite Systems, their mixed signals and policy reversals gave pause to defense industry officials, reducing the attractiveness of options that otherwise might have advanced corporate interests.<sup>1</sup>

DoD's merger policy also considers the potential impact a merger might have on innovation. Competition may be viewed very differently in markets with new, emerging and unproven technology than in mature product markets. Additionally, the recent and significant consolidation in the industry, make analysis of mergers that much more complex and difficult. While it is less likely in a concentrated industry context that such prime level mergers can be achieved without significant adverse effects on competition, mergers among second and third-tiers can continue as suppliers seek to improve both capabilities and market penetration. Overall, the numbers show that mergers have not been problematic from a competition standpoint. Last year DoD reviewed 27 transactions, one was withdrawn, and two required consent decrees with divestitures of key defense related units or imposition of "fire walls" to preserve competition.<sup>2</sup>

## **Acquisition Strategy**

DoD must also consider this new consolidated industrial environment when structuring acquisition and technology program strategies. As large defense firms became more vertically integrated, DoD issued a series of policies directed specifically at improving DOD insight into industry and the competitive effect of DoD buying actions. Two policies issued in 1999 require program managers and contracting officers to increase government insight into the subcontractor selection process and intervene where appropriate. The first focuses on increasing insight into the subcontractor selection process and the second addresses anti-competitive teaming and the potential to inhibit competition. Many small and mid-size companies feel they are being squeezed out of the competition as large conglomerates become more vertically integrated. DoD will continue to be vigilant in this area. The third policy issued last year concerns implications of acquisition strategies and technology plans on future competition. The purpose of this policy is twofold: to improve visibility into cases where competition may be at risk; and also, to establish a process to ensure issues that may transcend a single program and apply to entire product market, are considered on a DOD-wide basis. The objective is to encourage program managers to focus on these issues early on in the acquisition strategy when they have more flexibility to consider potential remedial approaches. In total, the intent of these policies is to help DoD be a smarter customer, to anticipate problems, and create more competitive opportunities for the defense industry at large.

## **Industrial Rationalization**

Another major area of challenge for government and industry is to foster efficiencies through increased internal and external restructuring: Studies show ample opportunities remain to reduce underutilized capacity, streamline processes, and reduce net costs to DoD. In July '93 DoD began allowing industry to claim reimbursements for restructuring costs, associated with mergers and acquisitions, including severance pay, plant closure costs, and unemployment payments as allowable costs on defense contracts.<sup>3</sup> At the same time Congress was introducing regulatory hurdles to make capacity rationalization process even more difficult. The battle cry in Congress was “no payoffs for layoffs.” Congress did this by passing regulations that would ban restructuring costs associated with plant and company rationalization. For mergers after Sep 30, 1996, contractors would need to show \$2 savings for every \$1 up-front cost reimbursement in order for plant rationalization to be funded.<sup>4</sup>

While DoD policy allows firms to claim costs associated with external restructuring against defense contracts under specific conditions, there may be insufficient incentives for defense firms to pursue internal restructuring. The goal is to encourage reduced overhead and closing excess facilities, not simply mergers and acquisition. Maintaining the production capacity of the Cold War buildup exacts high fixed costs on both government and industry that must be paid even for low rate production. The dilemma is that in the current world of primarily “cost-plus” contracts, cost savings gained through internal restructuring are mostly passed to the DoD. Defense firms are not sufficiently incentivized, as they would be in the commercial business, since they only receive a small share of the savings. A recent DSB Task Force, “Preserving a Healthy and

Competitive US Defense Industry,” concluded incentives were needed to encourage further rationalization.

Among its numerous recommendations were proposals to share savings with industry and to revise profit guidelines to reduce the reward for fixed assets while adding a factor to reward contractor cost efficiencies.<sup>5</sup> In response, DoD is considering a proposed policy tool to allow industry to retain a portion of internal restructuring savings, through adjustments to profit, for a period of years.

### **Budget and Financial Stability**

As one defense industry official quipped at a recent defense reform conference, “For many firms, life is too short to do government contracts. There are too many risks and too much instability.” Causes for instability are numerous including actions by Congress, unachievable cost and technology expectations, and program cost growth that should have been foreseen. Potential solutions include a shift toward multi-year budgets and appropriation, more realistic costing procedures, and wider use of multi-year production and development contracts

Instability is inherent in the government acquisition process. Rarely does a major weapon acquisition proceed from concept development to production as originally forecast. Annual changes in budget allocations, unachievable cost and technical expectations, and mid-course shifting in requirements combine to produce multiple adverse effects. Wall Street and industry officials increasingly come to perceive DoD as a “fickle” or “unreliable” buyer. Some innovative commercial firms become deterred from ever becoming involved in the defense market. Others become unwilling to invest in ways to reduce costs or improve capability when its return on such investments is

unpredictable. Frequent changes in fiscal year funding profiles extend the time required to field the product, which in turn, increases the cost and the risk of technological obsolescence.

In the last couple of years, DoD has begun establishing better and more regular communications with Wall Street analysts. This has helped ensure DoD's programs and plans are better understood by the financial world. DoD should continue to strive to offer as much transparency as possible with Wall Street to ensure that financial markets have available all possible information concerning DoD budgets and program accomplishments.

Additionally, cooperative actions by the Congress, the White House, and the Pentagon are necessary to strengthen the budgeting process and increase the stability of acquisition programs. After years of budget cuts, there is consensus for growing defense budgetary outlays for procurement and DRT&E that will provide stable, relatively predictable cash flow to the defense industry. Expanding the use of multi-year contracts could enhance program stability and accrue costs savings. Traditionally, Congress has been reluctant to embrace multi-year budgeting and instead prefers keeping its annual look at budgets. The multi-year contracts that are authorized are currently limited to a relatively small number of mature production programs. Congress should take steps to authorize pilot projects, in which high-priority R&D development programs could be pursued under multi-year agreements. In response, the Pentagon must provide more accurate program projections enabling a consensus between DoD and Congress on long-term spending plans. Other actions to improve stability also involve Congressional approval. One suggestion at the recent AIAA-sponsored Defense Reform Conference

was for Congress to establish legislative firewalls preventing the diversion of acquisition funds for operational requirements. In recent years, unexpected contingencies caused funds appropriated for acquisition programs to be diverted to meet operational needs. This diversion often contributed to program delays. Another suggestion was for the Administration and Congress to conduct two-year appropriations since DoD already conducts its program planning on a two-year cycle. Having Congress appropriate funds two years at a time would alleviate DOD from re-baselining its programs to keep in line with the annual ups and downs of appropriations. Congress could still make budget changes in the off-year, but the default condition would assume that programs do not change unless a specific action is taken.<sup>6</sup>

### **Civil Military Integration**

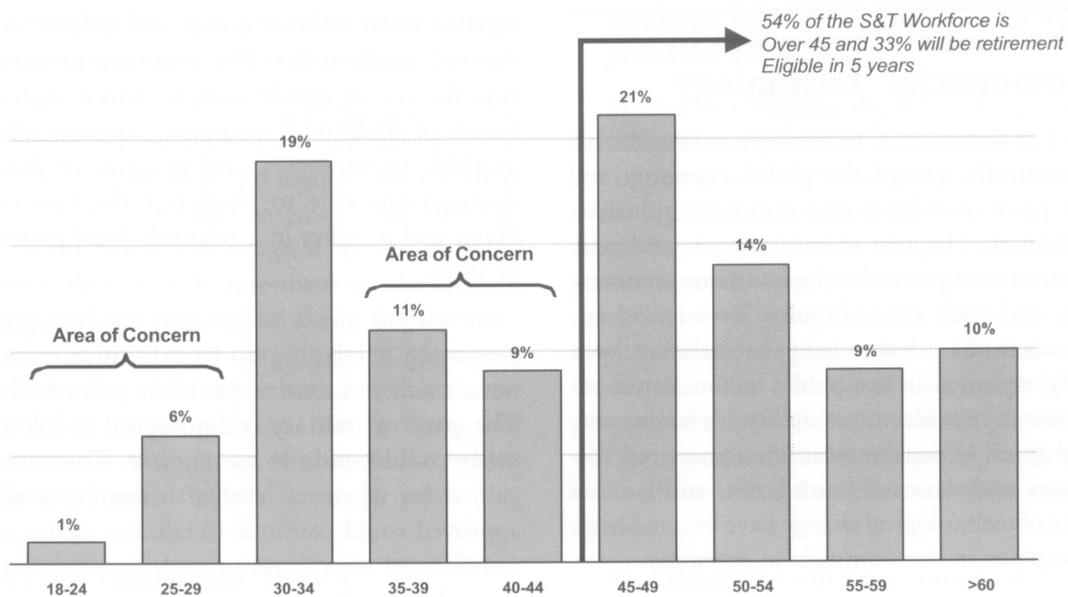
Over fifteen years ago, the Packard Commission set in motion “defense reform,” aimed at eliminating wasteful spending and inefficient practices. Economic globalization and the explosive advance in commercial technologies have exposed the probability of even more demanding threats than during the Cold War.<sup>7</sup> Underlying these developments is the increasing role commercial technology has in the design and manufacture of defense systems themselves. DoD undertook a series of acquisition and other reforms during the 1990s to revolutionize the way it does business with industry. Policy makers encouraged defense industry to apply their military technological expertise to civil problems. In ’93 SECDEF Perry issued a landmark memorandum that required DoD to use commercial specifications and standards for all procurement actions except those that are military-unique. DOD also worked with Congress and other Federal agencies to reduce statutes and regulations that prevented increased commercial-military

integration. Congress passed the Federal Acquisition Streamlining Act (FASA) in '94 and the Federal Acquisition Reform Act (FARA) in '95, which reduced government oversight and made purchasing commercial products for the federal government easier. The Information Technology Management Reform Act of '96 changed to the way DoD buys information systems, a key area in which DoD needs to leverage commercial capabilities better. The key to future military superiority will be in DoD's ability to adopt and adapt technology faster than competitors who will be able to draw from much of the same base. Recent policies are aimed at allowing defense firms to adopt commercial processes and enhance flexibility of their manufacturing lines so as to produce efficiencies and more opportunities for commercial and military product integration. Despite progress made through such measures, DoD must continue to leverage the commercial market and that of its allies. Eliminating barriers that isolate it from commercial practices is critical to meeting future military, economic, and policy objectives.

### **Attracting and Retaining the Best and the Brightest**

The human capital of our defense technology base also is under great pressures. A challenge for both government and industry is to ensure the availability of the necessary intellectual capital to meet national security needs. A study by Booz-Allen & Hamilton last year entitled, "US Defense Industry Under Siege—An Agenda for Change," concluded that the industrial base is deteriorating due to a variety of factors. One of the main factors is the increasing challenge to recruit and retain the top science and engineering talent so critical to developing the next generation of weaponry. Finding engineers and software designers is proving more difficult in the new environment of

dot.coms and stock options. About 1/3 of tech work force will be able to retire within 5 yrs. Moreover, defense companies have an unbalanced age profile, with few people in the 35-45 yr bracket that provide the next generation of key program managers and technology leaders and even fewer under 30.<sup>8</sup> In view of the critical role experience plays in these jobs, the bimodal nature of this distribution poses a challenge for attracting the intellectual capital necessary for future innovation. Government and industry must do a better job of raising public awareness of the technology challenges facing our industry which pose real and cutting edge opportunities for the best and brightest young scientists and engineers. If not addressed, these critical people-problems threaten the defense industry's ability to maintain its technological advantage.



**Figure 16: Avg Space Industry Science & Engineering Workforce Age Distribution**

**Source:** Booz-Allen & Hamilton, *Space Industrial Base Study*, 2000,

## **Enhance Global Industrial Linkages and Export Control Reform**

The export control system still serves a vital security function but it must be properly adapted to the commercialized, globalized new world of defense. Industrial and technology policies traditionally had two goals: guard against the proliferation of sensitive technology and preserve critical technologies and industrial capabilities.<sup>9</sup> While these goals remain valid, the regulations and procedures to protect industrial and technology secrets are now a serious impediment to trans-Atlantic cooperation.

The security procedures trace back to the Cold War when US military strategy presumed American technological superiority of the battlefield as a counterweight to the superior quantitative mass of the Warsaw Pact. The US had to prevent the Soviet Union from acquiring advanced technology that would erase America's competitive advantage. Working with allies, the US constructed an elaborate process to regulate the export of potentially military-relevant commercial technology, and the export of military equipment itself.

Since the end of the cold war, the export controls system was widened to block the dispersal of technology to other nations. The resulting system now does more to impede cooperation among allies than to block technology to opponents. It fails to distinguish adequately between friend and foe and between sensitive technology and obsolete technology. All are subjected to the same rule-based licensing process that is time consuming and seriously discourages the use of US components in foreign end items and collaborative development of hardware even causing some foreign firms to 'design around' US components.

Ironically, in an ever more interconnected globalization era where the US must stay engaged, the US is increasingly excluding itself because its export processes impede US industry from effectively competing in international markets. Export control reform is a central underpinning of US efforts to better fight the wars of the future together with its coalition partners. DoD's proposed reform initiative will remove impediments to defense trade and help facilitate security-enhancing, pro-competitive industrial linkages and US commitment to the Defense Capabilities Initiative (DCI) established in 1999 by the NATO Heads of State.

To expedite the process of export requests that support capabilities emphasized in the DCI, DoD and the State Department established the Defense Trade Security Initiative (DTSI)—the first major post-Cold War revision of US defense trade controls. The three main elements designed to allow more technology sharing with coalition partners while maintaining and enhancing security are as follows:<sup>10</sup>

- **Country-specific International Traffic in Arms Regulations (ITAR) exemptions:** The US is willing to offer new licensing exemptions to the ITAR for Treaty allies that share common principles with the US and have congruent policies in key areas of export controls, industrial security, intelligence, law enforcement, and trade reciprocity. The exemptions would be limited to the export of certain unclassified defense items and technical data and would be contingent upon the eligible countries “leveling up” on security and adopting more stringent approaches to third country exports. This approach allows the closest level of collaboration in R&D and other areas without going through the myriad of licenses now required.
- **NATO Flexible Licensing:** At a second level US is creating a broad range of flexible licensing vehicles for use with NATO and other treaty partners that could allow ‘one stop’ streamlined licensing instead of the multiple licenses that are now issued. These flexible licensing approaches would be available for a wide range of projects, including cooperative government-to-government programs, commercial sales, and private sector joint ventures and cooperative efforts. This approach, consistent with trends in the commercial world, moves away from the concept of

controls over individual transactions to certifying and assessing the integrity of a firm's overall security procedures and compliance.

- **Good government reforms:** The US has taken a number of steps to streamline its regulatory procedures and speed up the decision making process. By using computerization and electronic filing, DoD has already significantly reduced the time it takes to complete its internal license review from 46 days to 20 days.

DoD recognizes that trans-Atlantic defense cooperation will not succeed without changes in America's export control system. DoD has taken steps to support export control reform and ensure that national security is maintained within the competitive trans-Atlantic model. DoD's goal is to facilitate technology transfer to and from those countries that have made a commitment to "level up" on security in order to promote the ability of US warfighters to fight coalition wars and enhance competition in defense markets in an era of industrial consolidation. DoD seeks to tighten up export controls to third countries outside the coalition in order to maintain US technological edge. The reform will remove impediments to defense trade and install the "hard-wiring" needed to facilitate both DCI and security-enhancing, pro-competitive industrial linkages so vital to US national security.

### Notes

<sup>1</sup> AIAA Defense Reform 2001, "*A Blueprint for Action: Setting the Stage*," February 2001, 5.

<sup>2</sup> Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 34.

<sup>3</sup> Booz-Allen & Hamilton, 10

<sup>4</sup> Gerald I Susman and Sean O'Keefe, ed., *The Defense Industry in The Post-Cold War Era, Corporate Strategies and Public Policy Perspectives* (Elsevier Science Ltd., Oxford, UK, 1998), 178.

<sup>5</sup> Defense Science Board Task Force, "*Preserving a Healthy and Competitive US Defense Industry*," Washington DC, November 2000, 23.

<sup>6</sup> AIAA Defense Reform 2001, "*A Blueprint for Action: Setting the Stage*," February 2001, 33.

## Notes

<sup>7</sup> Gerald I Susman and Sean O’Keefe, ed., *The Defense Industry in The Post-Cold War Era, Corporate Strategies and Public Policy Perspectives* (Elsevier Science Ltd., Oxford, UK, 1998), 378.

<sup>8</sup> Booz-Allen & Hamilton, *A Defense Industry Under Siege*, 27.

<sup>9</sup> AIAA Defense Reform 2001, “*A Blueprint for Action: Setting the Stage*,” February 2001, 26.

<sup>10</sup> Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001

## **Chapter 6**

### **Benefits/Challenges**

If the US is to access and efficiently use the best industrial resources available—military and commercial, domestic and international—to meet its needs, it must leverage pressures of the market place to the maximum extent feasible. The next logical step in defense industry restructuring must be greater trans-Atlantic cooperation and more partnerships between American and European firms. European countries have had to accept foreign sourcing because they lack full-spectrum defense industries and the budgets required to sustain domestic sources alone. On the other hand, the US has always had a sufficiently large defense budget and a full-spectrum industrial base so that it could limit its procurement to domestic sources. However, with fewer defense dollars chasing fewer new programs, DoD will soon approach the point where it cannot sustain competitive opportunities in all areas of capabilities and products. One way to maintain competitive sources is to widen the industrial base. The best way to widen the industrial base is by trans-Atlantic collaboration that creates a de-facto enlargement of the industrial base.

### **Benefits**

The benefits for DoD pursuing pro-competitive, security-enhancing transatlantic industrial alliances are numerous. They promote consistency and fairness in dealing with

US allies. They permit access to state-of-the-art technologies and industrial capabilities. They expose industry to international competition helping to ensure that firms remain innovative and efficient. Integration cuts costs and yields more sophisticated systems that will be more competitive for export. Higher levels of joint R&D would allow greater and faster modernization of American and European defense industries. Strengthened industrial linkages with key coalition partners also facilitate interoperability among coalition forces and improve coalition warfighting.<sup>1</sup> Trans-Atlantic industrial cooperation, therefore, is not only necessary but also crucial for America's security.

US national security is dramatically enhanced through security alliances. Maintaining a successful NATO partnership rests not just upon the military might of NATO but also upon the economic and political strength of both Europe as well as the US. Maintaining alliances is difficult and how the US manages these relationships, as well as the military partnership, will determine how successful it can resolve security issues in the new century. Industrial concerns can act as either a wedge or an adhesive in the alliance. In the absence of an overwhelming external threat to hold together the alliance, they must not be allowed to become the wedge dividing the US from Europe.<sup>2</sup>

Although trans-Atlantic cooperation and consolidation offers potential benefits, the DoD has yet to look to European firms for expertise and production capability on a broad scale. The extent to which the Pentagon turns to Europe depends in part on whether governments on both sides of the Atlantic can overcome the following obstacles to a coordinated trans-Atlantic approach to defense industry consolidation.

## Challenges

### **The preference for self-sufficiency**

The first challenge is the preference for self-sufficiency. Both US and European governments have instinctive preferences to go it alone in defense production for several reasons. During the Cold War, Congress and DoD established restrictions on the use of foreign products in defense systems to preserve a domestic industrial base capable of rapidly producing the defense materiel needed to respond to a Soviet attack. The US preference to support national high technology research and channel taxpayers' money back into the national economy in conjunction with an unwillingness to compromise on national military requirements has created a bias in favor of domestic sourcing.

European policies and marketplace regulations and traditions are also protectionist. Defense industries are exempt from competition and free market rules under Article 223 of the 1957 Treaty of Rome. Although budgetary pressures have heightened its need for defense cooperation, European government's desire to retain self-sufficiency has not lessened. Its need to transcend fragmented national defense markets and at same time, its desire to sustain national defense industries has affected the pace and content of initiatives toward reciprocal opening of defense markets.

European governments are increasingly concerned about the absence of a 'two-way' street, given American reluctance to purchase European systems. Moreover, some observers have expressed concerns that European governments increasingly decide major procurement on a political rather than "best value" basis. The recent UK selection of the Meteor air-to-air missile (offered by the trans-European missile firm of Matra-BAE-Dynamics (MBD) over Raytheon's AMRAAM) and the European Space Agency's

refusal to provide funding to the joint venture between P&W and France's SNECMA to develop an upper-stage cryogenic rocket engine are recent examples of this 'fortress' Europe mentality.

European preferences of goods in their government procurement decisions combined with the US preference for self-sufficiency in defense research and production could precipitate the emergence of separate and adversarial defense markets within the Atlantic alliance. A creation of 'fortress' Europe/'fortress' America could lead in the short term to EU companies falling further behind, and in the long term, to the weakening of NATO and the Common European Security and Defense Policy (CESDP).<sup>3</sup> While this would undermine a trans-Atlantic security relationship, some say domestic preferences are justified given the significant defense trade imbalance and the political and economic pressures facing Europe. Many also believe that developing a robust European defense industry to support a common European defense identity will be difficult without more protection from American competitors. Indeed, the effort to carve out a distinct and autonomous European defense capability has created a new-found pride and Eurocentrism to provide for stronger security. This heightened attention in Europe to a European defense entity has been accompanied by a stronger parochialism for a European industrial base. Indeed, recent insistence by the French Defense Chief that the EU rapid reaction force be independent of NATO and have its own planning staff amplified US and British concerns. He said that France was committed to the trans-Atlantic alliance but saw the strengthening of EU military capability as a way of shifting the balance of power within NATO away from America and towards Europe.<sup>4</sup>

At the same time, Europe's defense base has consolidated significantly and two industrial giants, BAE SYSTEMS and EADS, have emerged. This newly heightened European parochialism and new European industrial entities create the perception to many US companies that it will be increasingly difficult to compete in Europe. The US sees the market becoming closed to American companies since Europe would unlikely choose a foreign firm for a major European weapons competition knowing that losing would mean the end for the competing European company. The declining defense budgets in Europe also mean that European companies need access to the US defense market to grow. Market access is an important complement to consolidation: just as mergers offered opportunities for economies of scale, so too can access to new or larger markets. With the perception that American companies cannot compete in Europe on a large scale and Europe cannot grow without access to the US market, US firms may be reluctant to encourage trans-Atlantic defense cooperation. US firms currently enjoy a 5:1 advantage in defense trade with its NATO partner and may prefer the status quo where they have good, albeit imperfect, access to fragmented European defense markets instead of accepting changes that might weaken their competitive position in the domestic US market.

### **Imbalance between US and Europe Defense Markets**

In addition to the pressure for self-sufficiency, differing market characteristics impede reciprocal access to European and American defense markets. The mismatch between the unitary nature of the US defense market and the fragmented nature of European defense markets creates different pressure on governments and is a major obstacle to reciprocal market-opening initiatives. While the US government can set

policies for consolidation of the defense industrial base, a number of European governments must coordinate their differing approaches and often divergent interests to encourage consolidation. These market differences lead to disparate time lines for consolidation and rationalization.<sup>5</sup>

The differing industrial characteristics also increase the difficulty of agreeing upon common requirements. US and European governments often have fundamentally different security priorities leading to different national military requirements. Successful collaborative programs depend upon the ability of governments to coordinate military requirements, define common specifications, and synchronize schedules for replacement. As governments and industry in the EU transition to a culture of greater integration, coordination of their national military requirements will improve and enable European governments to engage more effectively with the US on collaborative programs.

There is mounting pressure to develop a unified European armament procurement policy and related industrial base, as most nations can no longer afford to develop and procure defense items solely from their own domestic companies. Additionally, European governments are increasingly conscious of the importance that a more coordinated approach to defense procurements provides to the political cohesion and ultimately, military effectiveness of EU member states as partners in NATO or as a group pursuing their own, common security objectives. Much must be done to unify European arms procurement. A new European procurement office in Bonn, known by its French acronym OCCAR, is working to coordinate plans and a timetable, and in January won legal authority from its members—France, Germany, Britain and Italy—to requisition

and spend.<sup>6</sup> OCCAR officials know their impact will remain limited as long as each country has its own procurement office.

US and European governments are unlikely to coordinate their approaches to industrial consolidation unless each is confident of a “level playing field” in global defense markets. Subsidies to aerospace firms remain a source of tension. European governments remain dissatisfied with the US government’s funding of military R&D for private contracts and are reluctant about advocating explicit market-opening measures, including abandonment of offsets, without guarantees of reciprocal, improved access to the large US domestic market. US firms object to continued subsidies to state-owned defense industries in Europe and view the wide array of differing and sometimes opaque national defense procurement policies as discriminating against foreign suppliers. Only a reciprocal effort by government and industry on both sides of the Atlantic will ease these obstacles to the emergence of a more efficient and competitive alliance defense market.

### **Conflicting Export Control Policies**

The US and many European governments use arms exports to support foreign policy objectives and to sustain comprehensive national defense industrial bases. According to a survey completed last year, the US export control process is a major impediment to teaming arrangements and joint ventures between US and European companies.<sup>7</sup> The current system fails to adequately distinguish between sensitive technology and obsolete technology. By trying to limit far too many items of only limited sensitivity, it not only consumes resources that should be devoted to licensing truly sensitive technology but also discourages the use of American components in foreign end items and collaborative development of hardware. Europe’s sometimes

different approach to foreign policy has made closer cooperation harder to achieve. While both governments share a concern about the proliferation of conventional weapons, they often disagree about which destination countries constitute threats to global or regional security. Not all EU countries have the same laws nor do they enforce technology transfer controls with same degree of competence. If Europe insists on a “one-size-fits-all” security approach for its defense industry and exports, the US would have to maintain “highest-common-denominator” security procedures. This would only serve to impose added security burdens on transatlantic technology sharing that would raise costs and limit sharing. If allied governments can establish procedures to jointly manage their shared industrial base, transactions could proceed without licensing impediments and costs of security procedures would be lowered.

### **Inadequate European R&D Spending**

Europe spends too little on advanced R&D, which is critical to the next generation of technology. In addition to spending significantly more on defense procurement than do the Europeans together, the US spends almost four times more on R&D.<sup>8</sup> Moreover, the scarce dollars that Europeans spend is duplicative, given the lack of sustained R&D coordination among the European allies. Consequently, Europe falls farther behind technologically every year. Simply eliminating impediments to exporting US technology will not close this gap. Europe needs to spend more on R&D if it seeks to be a genuine partner bringing unique capabilities to the table.

### **Future**

Globalization of defense industry poses many challenges of reconciling and synchronizing the process of consolidation and achieving true trans-Atlantic defense

industrial cooperation. Can the US and Europe think of the trans-Atlantic defense market as one market? Will American markets be open to Europeans participating in order to make trans-Atlantic partnerships attractive? Will US Congress drop “buy American” provisions to permit US facilities to close in favor of European production? Will individual European governments be willing to abandon state ownership of defense industry and permit companies such as EADS to make, key decisions on a European-wide basis, on closing facilities, relocating operations, and directing R&D funds? As more international partnerships are formed and collaboration occurs, how will each country handle the problems of intellectual property, technology sharing, and export controls?

The process of defense industry consolidation on both sides of the Atlantic fundamentally impacts the long-term strength of the Atlantic alliance. The US believes industrial linkages among multiple firms competing effectively in both the large European and US markets and sharing technology subject to security safeguards characterize the best approach. In this model, the numerous benefits both the US and Europe can realize outweigh the risks.

To reap these benefits, however, various obstacles to trans-Atlantic defense cooperation and consolidation must still be overcome. Both sides need to encourage the infrastructure for trans-Atlantic collaborative programs in the near term in order to make possible more extensive cooperation in the long term. They must resist protectionist forces and encourage a rationalization and greater standardization of procurement policies and practices. Both sides need better coordination of arms export policies to handle risks associated with cross-border technology transfer that necessitate reform of

Cold War-era industrial policies and export controls. US and European strategies must take into account the extent of these challenges and continue to facilitate a transition to a more competitive, coherent, and transparent defense markets on both sides of the Atlantic.

### Notes

<sup>1</sup>Department of Defense, *Annual Industrial Capabilities Report to Congress*, Office of the Assistant Secretary of Defense (Industrial Affairs), January 2001, 47.

<sup>2</sup>John J. Hamre, President and CEO, Center for Strategic and International Studies. Address. The Globalization of the Defense Industry Conference, London, UK, January 2001.

<sup>3</sup>Alex Ashbourne, "Opening the US Defence Market," *Centre for European Reform*, October 2000, 3.

<sup>4</sup>"UK: French Defense Chief Cited on EU Rapid Reaction Force Independence from NATO," *FBIS International Press*, 29 March 2001.

<sup>5</sup>CSIS Atlantic Partnership Project, *Making Transatlantic Defense Cooperation Work*, Center for Strategic and International Studies, Washington D.C., 1996, 16.

<sup>6</sup>Daniel Michaels, "European Defense Firms Step Up To Compete With American Giants," *Wall Street Journal*, 8 March 2001.

<sup>7</sup>Amy Svitak, "US Execs: Export Rules Stall US-European Teams," *Defense News*, 19 March 2001.

<sup>8</sup>John J. Hamre, President and CEO, Center for Strategic and International Studies. Address. The Globalization of the Defense Industry Conference, London, UK, January 2001.

## **Chapter 7**

### **Conclusion**

From the onset of WWII and through the Cold War, the US and its allies built a formidable industrial and scientific technical base that was instrumental in achieving victory. The unrelenting nature of the fifty-year military-technological competition and the requirement it created for products, which no commercial enterprise could produce, resulted in the development of a unique defense industrial base. The end of the Cold War brought with it dramatic changes in the evolution of the trans-Atlantic industrial base over the 1990s. Sharply reduced budgets, a more technologically leveraged set of threats, an increasing importance of coalition warfare, and rapid changes brought about through globalization have influenced the entire nature of the government-industry relationship.

These trends prompted defense industry to undergo a dizzying pace of mergers and resulted in a virtual revolution of the Defense Department's way of doing business with industry. The Pentagon recognized that over time, it would not be able to tap into the resources offered by the global, commercial economy if it remained isolated by special regulations. While much progress has been made to reconstitute defense industry into a global, more commercially oriented industry, DoD must continue to reduce the barriers

that separate defense from commercial business so it can remain the world's fastest and best integrator of commercial technology into defense systems.<sup>1</sup>

Related to commercialization is the fact that defense companies must justify themselves to shareholders by the same standards of profits and cash flows as civilian commercial companies. As a result of the increased debt and operational problems resulting from the mergers and acquisitions, the defense sector experienced lower profits and correspondingly, lower stock prices. The defense sector's lackluster performance compared to other technology industrial sectors put it at a disadvantage in attracting investment capital and qualified people. DoD responded by sponsoring numerous studies and by instituting a number of reforms to safeguard the health of the industrial base and continue the process of rationalization.

A robust, financially stable, efficient and competitive defense industry is vital. The Defense Department must take steps to align defense procurement practices with market forces in order to continue obtaining high quality, affordable, and innovative products necessary to meet its 21<sup>st</sup> century responsibilities. It must continue to foster an appropriate enabling framework for industrial development and competition in an environment marked by dynamic change. In the emerging consolidated defense industry, DoD prefers a "competitive trans-Atlantic industrial model" characterized by industrial linkages among multiple firms on both sides of the Atlantic, competing effectively in both European and US markets, and sharing technology—without compromising classified information and without losing control of sensitive technologies. Trans-Atlantic industrial partnerships appear to be evolving more readily than trans-Atlantic cooperative programs led by governments. Such industrial interdependence can help

counter efforts toward US or European protectionism and possible increase trans-Atlantic defense trade. In this approach, both the US and Europe benefit from competition and interoperability; the NATO structure is strengthened; transatlantic firms gain access to the large US and European markets; and inefficiencies are reduced. While leveraging our allies' industrial base offers political, military, and economic benefits, numerous impediments remain that affect US-European cooperation on major weapon programs.

There are many challenges of reconciling and synchronizing the process of consolidation and achieving true trans-Atlantic defense industrial cooperation. Global events have dramatically influenced defense policy and defense industry and pose difficult decisions for both policy makers and industry officials. It is difficult to predict where events will lead or how cooperative and competitive relationships within defense industry today will evolve in the future. As Yogi Berra was fond of saying, "It ain't over, 'til it's over." A divergence over global strategy could drive the US and its NATO partners apart, while a common concern about interoperability could drive them closer together. The future of the DCI and CESDP and the connection between the two will be a critical ingredient in the outcome of this tension. The regulatory groundwork for industry consolidation across some national borders has begun but the final disposition and impact remains to be seen. The challenge will be to foster both competition and cooperation across the Atlantic in a way that binds Europe and America closer together to provide long-lasting, mutually beneficial rewards for all members of the alliance.

### Notes

<sup>1</sup> Ashton B. Carter and John P. White, ed., *Keeping the Edge—Managing Defense For the Future* (MIT Press, 2000), 130.

## Glossary

|        |   |
|--------|---|
| CESDP  | Common European Security and Defence Policy |
| DCI    | Defense Capabilities Initiative             |
| DSB    | Defense Science Board                       |
| DTSI   | Defense Trade Security Initiative           |
| IR&D   | Independent Research & Development          |
| ITAR   | International Traffic in Arms Regulations   |
| JSF    | Joint Strike Fighter                        |
| LM     | Lockheed Martin                             |
| DOD    | Department of Defense                       |
| DOJ    | Department of Justice                       |
| EU     | European Union                              |
| FTC    | Federal Trade Commission                    |
| NATO   | North Atlantic Treaty Organization          |
| SECDEF | Secretary of Defense                        |
| US     | United States                               |

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