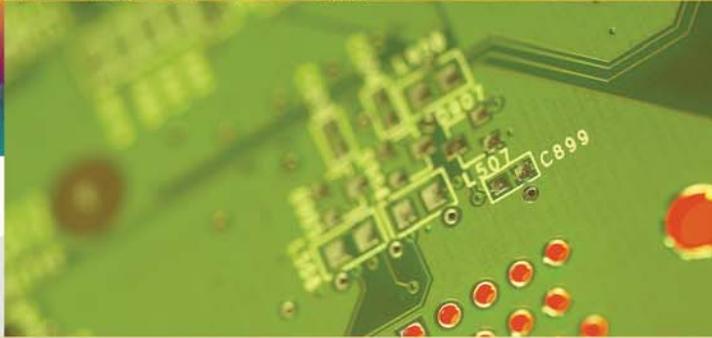
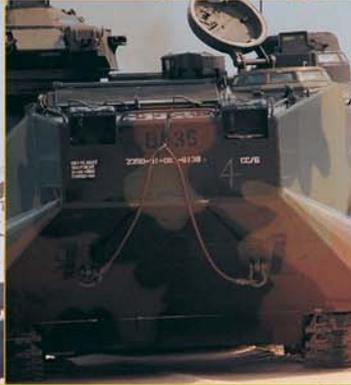
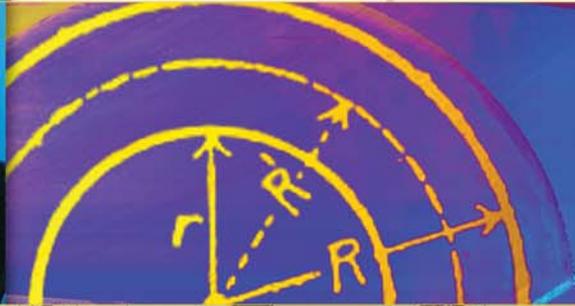


# Defense Trade: Keeping America Secure and Competitive



U.S. Chamber Member: \$20  
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Government Employee: Complimentary

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# Foreword

March 2007

Dear Reader:

The U.S. Chamber of Commerce is committed to the continuation of a strong national defense. To that end, we are pleased to present this study of defense trade.

This study provides information on the internationalization of the U.S. defense and aerospace industrial base and its implications for the United States. The information reflects the most current data available, as of press time, compiled by the Office of Management and Budget, the Department of Defense, the Department of Labor, and the Aerospace Industries Association.

The more than \$70 billion in aerospace and defense sales overseas is important to U.S. national security and the economy because it supports high-quality, high-paying U.S. employment; advances U.S. technology in critical national security areas; improves interoperability with allied forces; and holds down the costs of equipment purchased by the U.S. military.

This study shows that the defense and aerospace industry supports 3.6 million American private sector jobs and requires a supply of the nation's best and brightest technically trained and skilled talent. Further, it shows how the defense and aerospace industry is a major contributor to the U.S. trade balance. Finally, the worldwide engagement of the industry provides access to cutting-edge technology and strengthens the U.S. manufacturing base.

We trust you will find this document useful in assessing how important international engagement is to the U.S. defense and aerospace industrial base and to our national security.

Sincerely,



Thomas J. Donohue  
President and CEO  
U.S. Chamber of Commerce

*“For want of a nail, the shoe was lost; for want of a shoe, the horse was lost; for want of a horse, the rider was lost, being overtaken and slain by the enemy; all for want of care about a horseshoe nail.”*

**Benjamin Franklin, 1758**



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# Introduction

## The Internationalization of the Defense Industry and U.S. Defense Trade

One of the most important issues facing today's defense industry and government policymakers is the internationalization of the industrial base. To deliver 21st century national security solutions to our military, our nation's defense and aerospace industry must operate in an open and free international market economy. To remain global leaders, firms must be nimble and creative to thrive amid the realities of new markets, new competitors, and new sources of labor, capital, and ideas.

Today, our commercial and military aerospace sectors are highly engaged internationally, selling their products not only in the United States but to our allies as well. Their products contain systems and subsystems provided by international suppliers, which is part of an overall strategy to obtain the very best technology. Furthermore, this approach not only avoids having to develop technology that already exists outside the United States but also spreads risk. This, in turn, ensures broader U.S. market access internationally; directly supports a healthy, vibrant U.S. industrial base; and has directly contributed to the United States' current advantage in key military technologies, e.g., stealth, network-centric warfare, and space-based surveillance systems.

The history of the U.S. defense and aerospace industry reveals that this international involvement is not a new phenomenon but rather the norm. The defense industry of the 1880s leveraged European technology to build a steam and steel navy for America; it was exports to Europe and the rest of the world that kept the nascent U.S. aircraft industry alive in the early 1900s. The ability to tap into the global marketplace of ideas and technology fueled the innovation needed to develop the superior weapon systems of the Cold War, and it was exports that kept critical aircraft and defense goods production lines functioning during the 1990s.

By accessing and competing in global markets, the U.S. defense and aerospace industry has remained innovative, has been one of the largest positive contributors to the U.S. trade balance, and has contributed significantly to national security, selling more than \$70 billion in defense and aerospace products worldwide.

By fully engaging in the international marketplace, defense and aerospace companies create better jobs in the United States. Currently, U.S. defense and aerospace-related employment supports 3.6 million jobs for American industry workers and generates spending that drives economic growth throughout the economy. On the trade front, foreign sales of defense equipment over the last decade have employed some 55,000–70,000 American defense workers and have provided work for hundreds of subcontractors, according to the Aerospace Industries Association. These jobs are high-quality manufacturing, engineering, and advanced software positions, with commensurately high salaries and exciting advanced technology opportunities and challenges for this highly skilled workforce.

At the same time, the defense industry recognizes that defense trade raises many important issues. It must be able to maintain a healthy defense supplier base, it must protect strategic technologies, and it must ensure access to a secure supply of defense-related items and services. With thoughtful management, the international marketplace can support U.S. national security as well as the defense and aerospace industry.

# Key Findings

## Economics: The Importance of the Defense Industry

- U.S. defense expenditures totaled \$474.4 billion, representing 3.8% of U.S. Gross Domestic Product (GDP) in 2005.
- The leading sectors supplying the defense and aerospace market are the scientific research and development community, the architectural and engineering services industries, the telecommunications industry, and aircraft.
- Defense spending contributes to the economic strength of many state economies that are home to military installations and contractor activity, including California, Virginia, Texas, and Florida.
- All 50 states make a significant contribution to defense trade.

## Advanced Technology: On the Cutting Edge

- Defense programs are frequently on the cutting edge of scientific advancement.
- Exciting areas of research and development attract the best and brightest to the defense and aerospace workforce.
- Defense-related jobs are high tech and require a skilled workforce.
- Some of the largest and most complex software projects in the world, made up of millions of lines of software code, are developed to support government programs and activities.
- Advanced technologies are borne in the defense field and proven on the battlefield.

## Workforce: The Need for the Best and the Brightest

- Defense-related industry employment alone totals 3.6 million jobs in the United States, representing 2.4% of total national employment.
- Military and defense-related industry employment equals 5.7 million, which constitutes 3.8% of total U.S. employment.
- Scientists and engineers are key contributors to the U.S. defense and closely associated aerospace industry, with 1 in 10 engineers and 1 in 4 mathematicians working in defense-related jobs.
- Defense-related science and engineering careers pay well, with a median annual salary of more than \$77,000.

## Trade: The Importance of the International Marketplace

- Aerospace and defense exports reached \$73.3 billion in 2005.
- Aerospace and defense imports totaled \$28.5 billion in 2005.
- The United States posted a trade surplus in aerospace and defense products of \$44.8 billion in 2005. This segment of the economy was one of the largest positive contributors to the U.S. trade balance.
- U.S. aerospace and defense exports represented 8% of all U.S. merchandise exports to the world in 2005.
- Foreign defense sales have employed 55,000–70,000 American defense workers and hundreds of subcontractors during the past decade.

## Why Internationalization Benefits the United States

- It increases access to technology, capital, and skilled labor.
- It fosters industrial competition, helping drive down costs and spark innovation.
- It increases the pace of modernization by sharing risk and cost.
- It enhances interoperability with our allies, helping U.S. military forces be more effective.

*“The international considerations of Buy America provisions are immense. Isolationist, go-it-alone approaches have serious consequences on our relationships with our allies. Our country is threatened when we ignore our trade agreements. ... We don’t need protectionist measures that detract from international cooperation in order to insulate our defense and aerospace industries.”*

Sen. John McCain (R-AZ), *The Congressional Record*, September 29, 2006

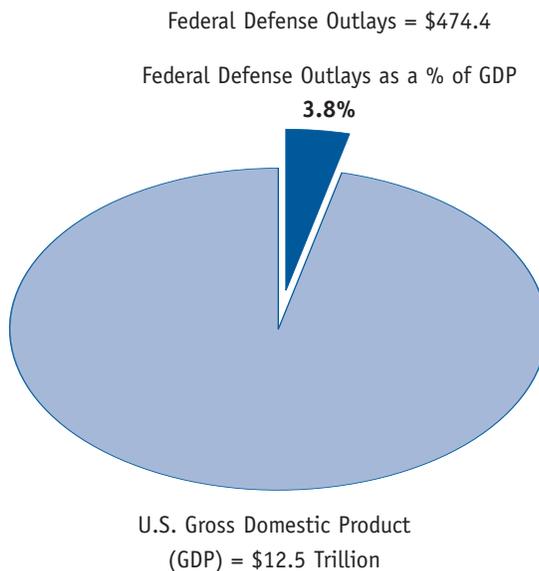
# The U.S. Defense Industry: National Defense Spending and the U.S. Economy

At the national level, U.S. defense expenditures totaled \$474.4 billion, representing 3.8% of the U.S. GDP of \$12.5 trillion in 2005.<sup>1</sup> The portion of the defense budget most relevant to the defense industry is the investment portfolio, consisting of procurement and research, development, test, and evaluation (RDT&E). The investment program of the U.S. Department of Defense totaled \$165.4 billion in FY 2005, including supplemental appropriations of more than 1% of the U.S. GDP.<sup>2</sup> Defense investment, as a percentage of U.S. GDP, is estimated to continue to be slightly above 1% throughout the remainder of the Bush presidency and into the immediate future.

Although large, the U.S. defense industry is not as large as the popular perception of “a vast military-industrial complex.” For example, the combined market capitalization of the five largest defense and aerospace firms is less than that of Wal-Mart Stores, Inc. Nevertheless, it is an industry that “punches above its weight.”

- National defense expenditures totaled \$474.4 billion in 2005.
- National defense expenditures represented 3.8% of U.S. GDP in 2005.
- Defense investment—procurement and RDT&E—was a little more than 1% of GDP in 2005.

Chart 1 | Federal Defense Outlays as a Percentage of Gross Domestic Product—2005



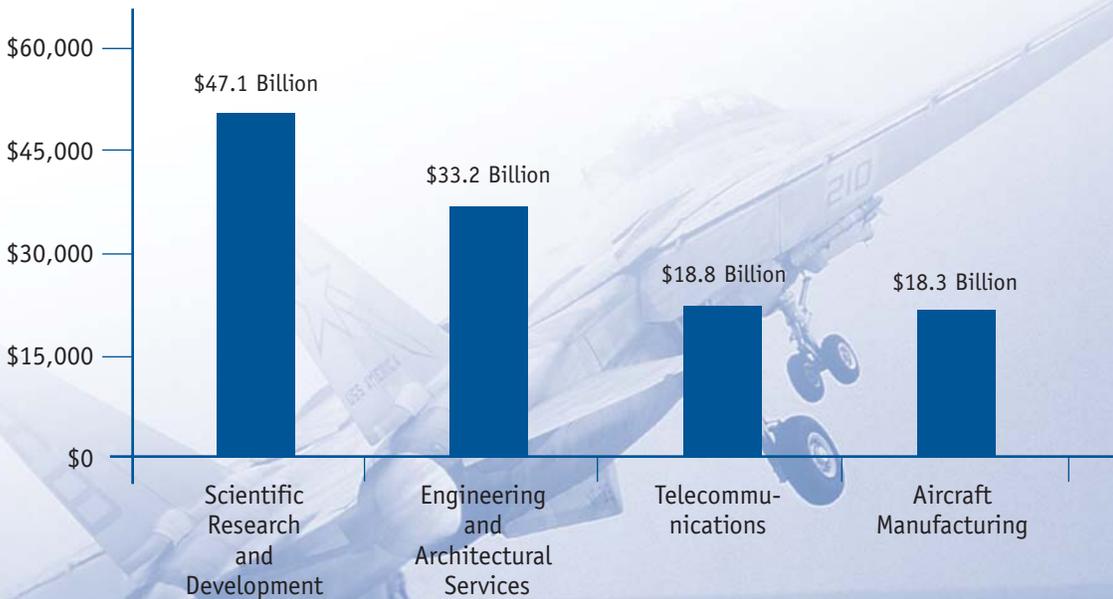
Source: Office of Management and Budget

### Defense Spending and the U.S. Economy

Defense industry spending has a strong impact throughout the U.S. economy. Major industries that supply products and services to the U.S. defense industry include important services industries such as scientific research and development and engineering and architectural services. Other major industry sectors closely tied to defense and aerospace spending are wholesale trade, telecommunications, and aircraft.

Defense purchases in the scientific research and development industry are projected to total \$47.1 billion in 2006, followed by projected defense purchases in the engineering and architectural services industry of \$33.2 billion. Other key industries that supply goods and services to the U.S. defense industrial base are telecommunications and aircraft manufacturing.<sup>3</sup>

Chart 2 | Key Industries by Total Projected Defense Purchase\*—2006



\*Direct and indirect purchases  
Source: U.S. Department of Defense

## Defense Spending and U.S. State Economies

While defense spending is important nationally, it also has important effects in specific parts of the country. States that are home to military installations and significant defense contractor activity, and thus derive important economic

benefits from defense spending, are California, Virginia, Texas, Florida, Maryland, Arizona, Georgia, New York, North Carolina, and Massachusetts. Defense expenditures in these 10 states represent nearly 55% of the projected \$491.7 billion in total defense purchases nationwide in 2006.<sup>4</sup>

**Chart 3 | Top 10 States by Projected Total Direct Defense Expenditures—2006**  
(in millions of 2007 dollars)

Rank	Company	2006	% of Total U.S. Defense Expenditures
	U.S. Total	\$491,685	
1	California	59,161	12.0%
2	Virginia	52,228	10.6
3	Texas	41,643	8.5
4	Florida	25,124	5.1
5	Maryland	18,775	3.8
6	Arizona	15,439	3.1
7	Georgia	14,961	3.0
8	New York	14,835	3.0
9	North Carolina	13,453	2.7
10	Massachusetts	13,400	2.7

Source: U.S. Department of Defense

## The U.S. Defense-Related Workforce

Another area where the defense and aerospace industry has a strong impact is on jobs. In 2006, defense-related industry employment totaled 3.6 million, representing 2.4% of the U.S. labor force. Below are highlights of the defense-related workforce:

- Defense-related industry employment totaled 3.6 million in 2006.
- Defense-related industry employment increased by nearly 50%, or 1.2 million jobs, between 2000 and 2006.
- Private defense-related employment totaled 2.4% of total employment in 2006.
- Total defense-related employment, which includes the U.S. Department of Defense military and civilian workforce as well as defense-related industry jobs, was 5.7 million in 2006, representing 3.8% of the U.S. labor force.<sup>5</sup>

Although substantial concentrations of defense-related employment are found in the federal government, the private sector plays a significant role as well. The aerospace product and parts manufacturing industry is heavily reliant on defense spending because it designs and constructs military aircraft. The navigational and measuring manufacturing industry designs and develops complex integrated electronics and guidance systems in aircraft, missiles, and rockets. Finally, the search and navigation equipment manufacturing industry designs and builds radar, sonar, infrared honing, and many other tracking and location systems for use by the military. At the same time, the modern-day defense industry relies more and more on commercial off-the-shelf products, thus supporting numerous jobs in the private sector that are fully intermingled with the nondefense production of goods and services.

**Chart 4 | Defense-Related Military and Private Industry Employment as a Percentage of Total U.S. Employment—2000–2006**

	2000	2001	2002	2003	2004	2005	2006
Total U.S. Labor Force	142,016,000	144,904,000	146,104,000	147,526,000	148,575,000	150,255,000	152,041,000
Active Duty Military	1,449,000	1,451,000	1,478,000	1,500,000	1,494,000	1,455,000	1,441,000
Department of Defense Direct Hire Civilian Workforce	660,000	650,000	650,000	649,000	650,000	660,000	665,000
Defense-Related Industry Employment	2,425,000	2,520,000	2,850,000	3,285,000	3,780,000	3,850,000	3,600,000
Defense-Related Industry Employment as a % of Total U.S. Employment	1.7%	1.7%	2.0%	2.2%	2.5%	2.6%	2.4%
Total Military and Defense-Related Industry Employment	4,534,000	4,621,000	4,978,000	5,434,000	5,924,000	5,965,000	5,706,000
Total Military and Defense-Related Industry Employment as a % of Total U.S. Employment	3.2%	3.2%	3.4%	3.7%	4.0%	4.0%	3.8%

Source: National Defense Budget Estimates for FY 2006, Office of the Under Secretary of Defense

## U.S. Defense-Related Occupations: the Best and the Brightest

Most important, the U.S. defense and closely associated aerospace industry needs a constant supply of the nation's highly skilled and educated scientific and engineering talent to maintain its competitiveness. Defense spending generates good jobs and well-paid careers across many scientific and technical fields, including electrical and electronics engineering, aerospace engineering, and mechanical engineering. These occupations, among others, contribute substantially to the production of military-related hardware and software.

For the U.S. military to remain competitive, defense and aerospace firms must continue to attract and retain the best and brightest scientists and engineers so that they can develop systems and build products that keep our fighting forces the envy of the world.

## Defense-Related Science and Engineering Workforce

- 1 in 10 engineering jobs are tied to defense-related spending.
- 1 in 3 aerospace engineers work in defense-related jobs.
- Almost 1 in 10 computer software engineers work in defense-related jobs.
- Nearly 1 in 10 electrical engineers work in defense-related jobs.
- 1 in 4 astronomers work in defense-related jobs.
- 1 in 4 mathematicians work in defense-related jobs.
- Nearly 1 in 5 physicists work in defense-related jobs.<sup>6</sup>

The Department of Defense projects that it will need more than 425,000 civilian computer specialists, scientists, and engineers to support the nation's defense and aerospace industrial base in 2006. Of these occupations, the Defense Department anticipates needing more than 175,000 computer specialists and mathematicians and scientists in 2006.

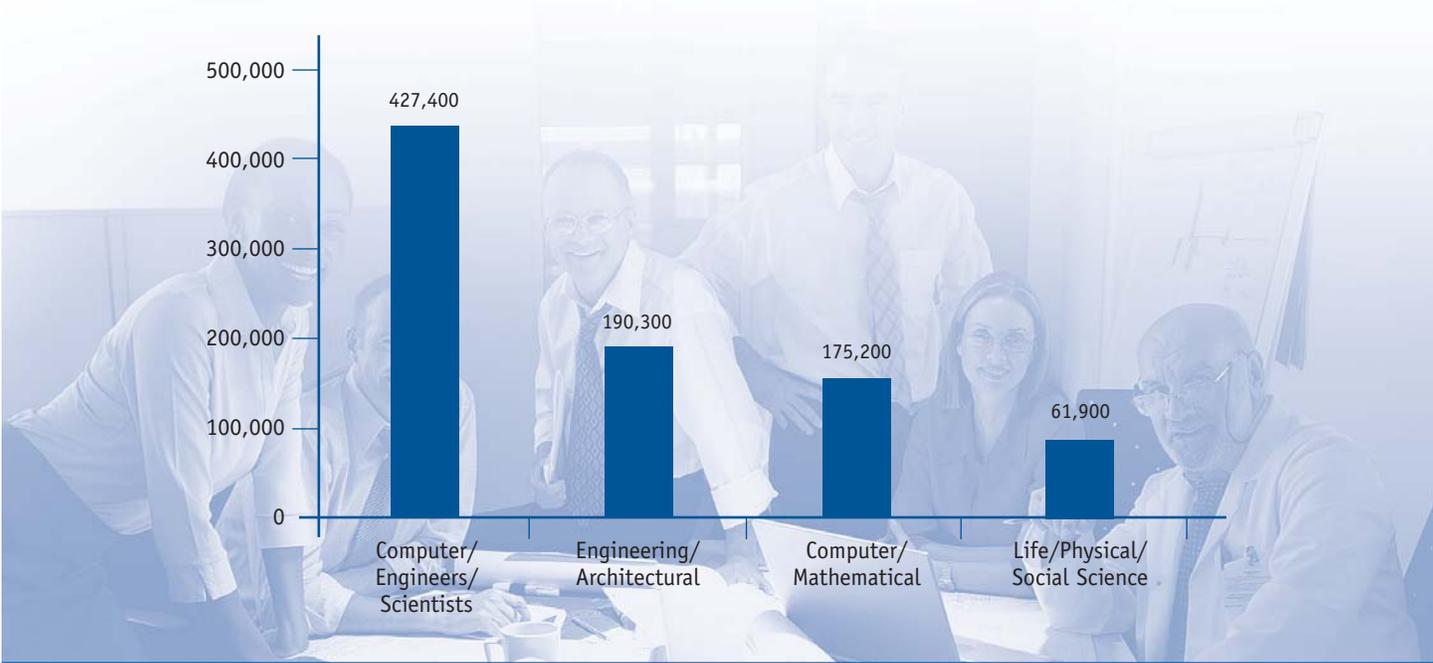
Further, projected employment requirements of the defense and aerospace industry include 36,600 electrical and electronics engineers and 17,600 aerospace engineers in 2006.<sup>7</sup>

## Defense Spending Supports High-Skilled, High-Wage Careers

Defense spending creates a highly skilled, well-paid science and engineering workforce. In 2005, defense-related science and engineering occupations paid a median annual salary of more than \$77,000.<sup>8</sup>

These occupations generally require at least a college degree. In many of these occupations, the overwhelming majority of employees have college degrees as well as postsecondary degrees.

Chart 5 | Projected Defense and Defense-Related Civilian Employment of Engineers & Scientists—2006



Source: U.S. Department of Defense

**Chart 6 | Key Defense-Related Science and Engineering Occupations by Salary & Training—2005**

Occupation	2005 Annual Median Salary (\$)	Education and Training	College or Higher (%)
Astronomers	\$104,670	Doctorate	92.3%
Physicists	89,810	Doctorate	92.3
Nuclear engineers	88,290	Bachelor's	89.1
Aerospace engineers	84,090	Bachelor's	83.9
Computer software engineers, systems software	82,120	Bachelor's	83.2
Mathematicians	80,920	Doctorate	74.1
Electronics engineers, except computer	78,030	Bachelor's	83.0
Engineers, all other	77,150	Bachelor's	80.5
Chemical engineers	77,140	Bachelor's	92.3
Computer software engineers, applications	77,090	Bachelor's	83.2
Electrical engineers	73,510	Bachelor's	83.0
Materials engineers	69,660	Bachelor's	68.1
Mechanical engineers	67,590	Bachelor's	80.2
Civil engineers	66,190	Bachelor's	87.5
Computer specialists, all other	59,420	Associate	65.8
Chemists	57,890	Bachelor's	94.4

Source: Bureau of Labor Statistics, Office of Occupational Employment Statistics, *May 2005 National Occupational Employment and Wage Estimates and Occupational Projections and Training Data*, 2006–07 Edition

## Defense Trade and National Security

To be the best in the world, the U.S. military demands cutting-edge technology and constant innovation from the defense and aerospace industry. As a result, it is critical that American industry retains and grows its technological prowess in critical high-technology defense industry areas. Ultimately, however, our nation must be able to acquire the best technologies regardless of where they are made.

As the 1999 Defense Science Board (DSB) Task Force on Globalization and Security noted, the U.S. Department of Defense once depended upon, and could afford to sustain, a dedicated domestic industrial base for the development, production, and provision of its equipment and services.

The U.S. defense industrial base no longer exists in its Cold War form. Instead, the Department of Defense is now supported by a broader, less manufacturing-intensive industrial base that is becoming increasingly service-oriented and international in character.<sup>9</sup>

The final report of the 1999 DSB task force found that over the last decade the U.S. Department of Defense has moved from relying almost exclusively on a captive U.S. defense and aerospace industry to depending more on the commercial market, both domestic and international. This saves the U.S. government, and consequently all taxpayers, money while providing access to world-class technology. Therefore, the government realizes lower costs and a lower proportion of U.S. GDP devoted to military spending.

This shift by the U.S. Department of Defense has also led American defense and aerospace firms to look overseas not only for cutting-edge technology and the latest innovations to support the U.S. military but also for new customers. This creation of new cross-border industry linkages (from mergers to joint ventures to teaming) has a number of tangible effects:

- First, it increases U.S. sales abroad and builds new levels of interoperability with potential coalition government partners, which enhances the effectiveness of U.S. military operations.
- Second, it supports thousands of high-technology, high-paying jobs based upon defense exports to friends and allies.
- Third, it enhances U.S. security by giving us access to a whole new set of technologies.
- Fourth, it enhances competition in defense markets, which, in turn, lowers costs for the United States.

While U.S. military spending and future-oriented research and development are critical to the defense and closely associated aerospace industry, growth in other markets is also important. Following the end of the Cold War, fewer purchases of weapon systems by the U.S. Department of Defense put significant pressure on traditional suppliers. Consequently, defense companies looked to the international market for additional sales to keep their U.S.-based production lines open.

Encouraged by the U.S. government to support essential interoperability with friends and allies, many of these sales were in direct support of key U.S. national security objectives. Additionally, this overseas push to buy and sell defense articles and services allowed the industry to form alliances and pool scarce resources with like-minded nations. Increased sales overseas also lowered the per unit cost for systems bought by the U.S. government

and protected many jobs that would have been lost if export sales had not materialized.

Strategically, this led to several outcomes. U.S. defense firms began working with foreign companies to win new projects. At times, such combinations have allowed U.S. firms to obtain new components and advanced technologies from foreign suppliers that would otherwise be unavailable. In other cases, future sales to foreign governments have relied on partnering with overseas firms.

The results? The most recent trade statistics show that the U.S. aerospace and defense industry maintains a healthy trade surplus with the world. In 2005, aerospace and defense exports totaled \$73.3 billion, while imports totaled nearly \$28.5 billion. This means that the United States posted a positive trade surplus in aerospace and defense products of \$44.8 billion.<sup>10</sup> This segment of the economy was one of the largest positive contributors to the U.S. trade balance. These technology imports and exports range from biotechnology and optoelectronics products to nuclear technology, aerospace, and weapons.<sup>11</sup>

**Chart 7 | Aerospace and Defense Trade Balance—2001–2005**

Year	Exports	Imports	Trade Balance
2001	\$64.2 billion	\$32.9 billion	\$31.3 billion
2002	\$62.2 billion	\$27.4 billion	\$34.8 billion
2003	\$58.3 billion	\$25.8 billion	\$32.5 billion
2004	\$61.9 billion	\$26.4 billion	\$35.4 billion
2005	\$73.3 billion	\$28.5 billion	\$44.8 billion

Source: U.S. Department of Commerce, Foreign Trade Data, by 5-digit end-use codes

From 2001 to 2005, U.S. defense exports averaged \$12 billion a year, with imports running \$2 billion a year.<sup>12</sup> In 2005, exports of defense products covering military aircraft, aircraft launching gear, engines and turbines for military aircraft, tanks, artillery, missiles, and military apparel and footwear totaled \$12.8 billion, representing 17.5% of all aerospace and defense exports.

**Chart 8 | U.S. Defense Exports—2001-2005**

Year	Aerospace & Defense Exports	Defense Exports	Defense as a Total of All Aerospace and Defense exports
2001	\$64.2 billion	\$ 11.6 billion	18.1%
2002	\$62.2 billion	\$ 11.7 billion	18.8%
2003	\$58.3 billion	\$ 11.5 billion	19.7%
2004	\$61.9 billion	\$11.9 billion	19.2%
2005	\$73.3 billion	\$12.8 billion	17.5%

Source: U.S. Department of Commerce by 5-digit end-use codes

### The Globalization of the U.S. Defense Industrial Base

The United States, as a fundamental matter of national security, wants to maintain a healthy and vibrant indigenous defense industrial base. However, the U.S. defense industrial base has benefited from the introduction of international competition as well as from the introduction and application of technologies from non-U.S. sources.

For example, defense industry analyst Pierre Chao of the Center for Strategic and International Studies (CSIS) noted that many of the weapons that enable the United States' military superiority can trace their roots to foreign science and technology. The development of the atomic bomb, for instance, was based on a group of German scientists who fled Nazi Germany. The modern submarine was invented by Irish immigrant John

Holland. Space launch vehicles and intercontinental missiles can be attributed to a group of German scientists, including Werner von Braun. The helicopter was perfected by Russian immigrant Igor Sikorsky. Sir Frank Whittle's jet engine and tank were British inventions.

This tradition continues today. The Army's M1A2 Abrams tank uses a German 120mm cannon and British armor technology, and the Stryker armored vehicle was originally a Swiss design. The Marine's new howitzer is a British design. The president's next helicopter will be an Anglo-Italian design. America's next generation Atlas space launch vehicle uses a Russian rocket engine, while the next generation F-35 Joint Strike Fighter uses British engine technology.<sup>13</sup>

While preservation of the U.S. defense industrial base is a key national security priority, its sustenance does not stand in a vacuum separated from worldwide technology and industrial developments. Today, U.S. military systems and technology are the weapons of choice throughout the world, providing both U.S. strategic and tactical advantage to U.S. war fighters and first-class interoperable systems to our friends and allies.

It has been the fusion of both domestic excellence and key contributions from abroad that have combined to create U.S. military superiority in so many critical defense technology areas. The United States must retain the flexibility to adapt its defense development and acquisition policies toward the use of those international designs and products that make good business sense. This flexibility serves to accelerate the introduction of advanced military systems into the field in a way that protects the lives of American servicemen and servicewomen.

# Conclusions

## Supporting Our Nation's Military

The global defense environment of the 21st century will change significantly in coming years as the security challenges facing the United States also change. U.S. defense trade policy must ensure the following:

- Emerging technologies are made readily available to the war fighter for new and advanced applications, whatever the source.
- The U.S. Department of Defense and its industry partners have all the tools possible to ensure that the U.S. defense industrial base remains strong and competitive.
- An open and free international market is available for advanced technology exports to our friends and allies.
- When it is in the national security interest, the United States makes appropriate use of foreign partners and sources of supply.

The United States has nothing to fear from competition in the international defense marketplace; rather, it remains an incredible opportunity to create American jobs, ensure that our weapons systems are second to none, and advance our national interests. As a matter of prudence, America must prepare for the ongoing globalization of this market in a manner that ensures its continued preeminent position and maintenance of market share. From the twin perspectives of the U.S. national interest and the health of our defense industrial base, there are significant benefits to be accrued from continuing to remain engaged and competitive in the emerging global defense environment.

## Supporting Our Friends and Allies

U.S. defense exports are essential in supporting our nation's broad foreign policy goals and objectives. Defense trade enables the U.S. government to achieve the following:

- Enhanced bilateral and multilateral security relationships with friends and allies.
- Expanded security commitments, that, in turn, strengthen our broader bilateral diplomatic and security relationships.
- Long-term partnerships with foreign militaries acquiring U.S. weapons systems, further strengthening these relationships.

In the context of international defense cooperation, defense trade serves as a critical element of U.S. security policy. Decisions to buy U.S.-made defense systems factor into the consideration of allied nations' defense strategies and policies. Defense trade serves to enhance the interoperability of allied systems with those of the United States and frequently includes agreements with allies related to research, development, production, procurement, and weapons support that transfer technology both to and from the United States and its allies. Thus, the ensuing technology transfer supports the military activities undertaken by both the United States and its foreign allies, placing them on a more effective and enduring basis. For example, common communications platforms will be obvious benefits to the war fighters of both the United States and its allies, facilitating greater interoperability.

## Growing the U.S. Defense Industrial Base

A strong U.S. defense industrial base is essential to our national security. International defense exports

- support critical U.S. defense production capabilities,
- sustain a highly skilled U.S. defense engineering workforce,
- strengthen the U.S. industrial base and preserve key U.S. production capabilities, and
- keep critical military production lines open and workers employed across the nation.

The data presented here overwhelmingly demonstrate that the United States enjoys a substantial trade surplus in the defense and aerospace sector—this advantage is largely due to our ability to win in a free and open defense trade environment. Our trade surplus in the defense and aerospace sector can be expected to continue as long as the United States maintains its advantage in defense technology and U.S. defense trade policies remain open, balanced, and even handed.

## Growing American Jobs

The education and training of the defense and aerospace workforce are increasingly becoming critical issues for the defense and aerospace industry. For the United States to remain competitive in the emerging defense environment, it must begin to do the following:

- Sustain its current level of defense employment on foreign defense programs. According to data from the Aerospace Industries Association, during the past decade, foreign defense sales have employed approximately 55,000–70,000 American

defense workers and provided work for hundreds of subcontractors. Sustaining this level of employment on foreign programs will be critical in addressing a portion of the broader defense and aerospace workforce problem, serving to ease the burden of replacing workers soon to be lost through retirement and attrition.

- Attract tens of thousands of defense scientists, engineers, and skilled laborers into the defense and aerospace job market. With the projected retirement of potentially hundreds of thousands of highly skilled workers and engineers over the next decade, defense exports will play an even larger role than they have in the past due to forthcoming generational shifts in the current defense and aerospace workforce.

## Ensuring America's Technological Competitiveness

The defense industrial base of the 21st century will increasingly be global in nature and scope. Additionally, the complexity of current military operations and defense organizations—which often require highly integrated information technology, sensor, and net-centric systems working in a joint service military environment—will place a premium on innovation and rapid technology insertion for the war fighter. To remain competitive in this increasingly complex and global defense environment, the United States must

- continue to innovate and advance the state of the art in technology development, applied technology, and industrial and manufacturing processes;
- maximize development of advanced defense technology;
- remain actively engaged with foreign partners and fully open to technologies developed by friends and allies; and

- stay engaged in the international defense marketplace, working to ensure that U.S. defense systems and technology retain a decisive advantage.

## Ensuring Benefits of International Competition

As a matter of policy, the United States must make certain that its export control, technology transfer, and defense trade practices are appropriate to the new global defense market. At the same time, it must insist that foreign procurements do not exclude U.S. companies from greater opportunities to compete in more open markets overseas. The benefits of international defense competition to U.S. industry are many:

- International competition requires that U.S. industry becomes more innovative and brings better products to all the defense markets in which it competes.
- This competition serves to benefit both the U.S. military and industry, as the technologies generated from increased competition are adapted to other defense enterprises.
- Foreign defense trade serves to lower weapons systems procurement costs to the Pentagon by decreasing unit costs and spreading risk.

At the end of the day, the U.S. defense industrial base serves the men and women in uniform. To meet their needs, it is essential that they are provided with the most advanced technology and systems available to the United States. To meet this critical obligation, it is imperative that:

- The United States maintains the most advanced defense capabilities and industrial base in the world today.

- The U.S. industrial base bolsters American preeminence in defense science, technology, engineering, and industrial production, and it provides our soldiers, marines, seamen and airmen technologically superior weapons systems allowing them to prevail against any potential foe on the battlefield.
- The U.S. military continues to employ its advanced technologies to win military conflicts quickly and with as little loss of life as practicable.

To sustain our dominant world position, the U.S. defense and aerospace industry will perform best in a free and open international market environment that permits the introduction of advanced technologies into the field for the war fighter as expeditiously as possible. The complexity and interdependencies of the worldwide defense market require that the United States remain fully engaged, with an overall strategy of obtaining the best technology available to service U.S. national security interests. Our global leadership in the field of defense trade is best ensured through policies that recognize the reality that the internationalization of the defense industry is a net benefit to the United States.

# Endnotes

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