



The Aerospace and Defense Industry in the U.S. A financial and economic impact study

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Preface

This study is intended to provide input to the ongoing national dialogue about the contributions of the aerospace and defense (A&D) industry to the economy of the United States of America (U.S.). Among other uses, we hope our findings of fact and conclusions derived will contribute to the current discussions about defense budget reductions and their potential impacts.

Our findings are derived from publically available national and state level data from sources such as the Bureau of Labor Statistics (BLS), National Census Bureau, Bureau of Economic Analysis (BEA) and company financial filings with the Securities and Exchange Commission (SEC). These findings may vary slightly from citations provided by certain sources such as state economic

development web sites, think tanks or special purpose economic impact assessments, which may be due to differences in industry scope, definition or timing. Indeed our direct, indirect and induced employment, GDP, cash taxes paid and certain other measures may appear conservative when compared to other recent studies, which had broader definitions or included a more expansive scope. We sought the input of Aerospace Industries Association of America (AIA) on our data and findings, and incorporated such input where we believed it helped to improve the accuracy, vet differences, or resolve discrepancies related to the study.

We offer a special thanks to AIA leadership for sponsoring this study and providing feedback.

Executive summary

This report was commissioned by AIA to assess the contribution and financial impact the U.S. aerospace and defense industry has had on the American economy, in terms of employment, cash taxes paid, impact on gross domestic product and other financial, economic and qualitative factors. Although typically focused on military and commercial aircraft, space systems and related supply chain portions of “aerospace and defense,” we broadened the definition for this study to include land vehicles and systems, naval vehicles and systems, security and defense contracting software and services. The scope does not cover the users of these products and services, thereby excluding the air transportation industry (cargo and passenger airlines) as well as government employees.

We estimate that the U.S. aerospace and defense industry directly employed 1.05 million workers in 2010. These workers received \$84.2 billion in wages and paid \$15.4 billion in U.S. Federal individual income taxes, and \$1.9 billion in state individual income taxes. Although not directly in the scope of this study, in addition we found that the Federal government employs an estimated 845,198 aerospace and defense skilled workers at armed forces maintenance and repair depots, National Aeronautics and Space Administration (NASA), Federal Aviation Administration (FAA), other defense agencies including Defense Advanced Research Projects Agency (DARPA) and civilians working at the Department of Defense.

We found the industry has an estimated indirect and induced employment of 2.36 jobs for every 1 directly employed. This employment multiplier is a “direct effect” multiplier, which accounts for primary and secondary effect employment associated with the aerospace and defense industry. It does not contemplate “final demand,” or employment associated with tertiary effect employment well beyond the direct effect of this industry’s employment base. Thus, we believe that indirect and induced employment totals 2.48 million workers, in addition to those cited above who are directly employed. Together with these indirect employees, we estimate the grand total direct, indirect and induced employment associated with the U.S. aerospace and defense industry is 3.53 million jobs, not including industry skilled workers employed by the Federal government or airlines.

We estimate that these U.S. aerospace and defense companies generated \$324.0 billion in sales revenue in 2010, with \$15.6 billion in net income after tax at an average pre-tax reported operating profit margin of 10.5%. This margin percent metric was below average, when compared to other industries in America. These companies paid \$5.5 billion in corporate income taxes on their earnings, as well as \$1.7 billion in state income and similar business taxes. Thus together with individual direct employee taxes, the total industry generated an estimated \$37.8 billion in wage and income based taxes to state and Federal government treasuries, not including the taxes paid by indirect and induced industry employment.

The industry is the largest net exporter, and one of the largest contributors to our nation's gross exports at \$89.6 billion, with a larger portion made up of commercial aircraft bound for foreign carriers. The industry's contribution to the nation's GDP is 2.23%, and as described below, we conclude the industry "punches above its weight," when considering other beneficial and qualitative impacts to our economy beyond these metrics.

Indeed the industry contributes in ways not directly included in GDP, employment, and taxes paid. Although it has only been 108 years since the Wright Brothers' first flight, the industry has contributed fundamentally to the way we live, work, travel and communicate with the technology created and continued innovations in jet aircraft, communications satellites, the internet and Global Positioning Systems (GPS), for example. Also, the industry is primarily responsible for the reduction of casualties in armed conflict due to the technology innovations that keep our warfighters out of harm's way with unmanned aircraft, sophisticated surveillance sensors and over the horizon strike capability.

Current economic challenges resulting in defense budget declines may impact direct and indirect employment, ability to conduct research and development, and taxes paid. On the other hand, the current up-cycle in commercial aircraft production, thus employment, portends years of future growth potential. However, due to its weighting, the uptick in commercial aircraft production is not expected to make up for the shortfall in overall industry revenues and employment due to the size of the pending defense downturn.

This study demonstrates the significant economic and financial contributions made by the aerospace and defense industry, and its broader impact on our society. These will be important considerations as constituents assess the impact of changes to investments in research and development and the industrial base, and the continued ability of the industry to create the next generation of game changing products and services.

Introduction



The defense industry has its origins in antiquity with the use of primitive weapons such as catapults, bow and arrow, the invention of gunpowder, and subsequent development of guns and cannons. Implements of armed conflict, provisioned by a commercial industry supported the Revolutionary War efforts, as the aerospace and defense industry in the U.S. has its roots in the very beginning of our country's history. The industry in America had its formal beginnings with the commissioning of the original six frigates, which were ordered in 1794 by Henry Knox, our first Secretary of War.



Since the first powered flight by the Wright Brothers on December 17, 1903, a little over a century ago, the aerospace and defense industry has changed the very nature of business and leisure travel as well as armed

conflict. Throughout our history, the defense industry, and later the commercial and military aerospace and defense industry, have played a key part in our country's evolution, intertwined with and contributing to the economic growth and maturing of major metropolitan areas, such as Washington State's Puget Sound area, Southern California, Wichita Kansas, Dallas/Ft. Worth and Washington DC, for example.

Technology innovations, many of which emanated from the U.S. aerospace and defense industry, have played a major part in the economic advancements made in the U.S. in the last century. Often cited are economic developments created out of necessity related to the industrialization of the defense industry during World Wars I & II, the Korean Conflict, the Vietnam War and the more recent Middle East conflicts in Afghanistan and Iraq. Game changing technology innovations were created or improved, such as the jet engine, supersonic flight, space flight, radar, communications, direct-to-home television broadcast and GPS navigation satellites, and development of the internet, for example.



The Apollo moon mission, culminating in the first man to land on the moon on July 20, 1969, was probably one of the most iconic moments in the development of the aerospace industry, only 66 years after the Wright Brothers' first flight.



Finally, the U.S. aerospace and defense industry enables our nation to support humanitarian causes, help in disaster relief and bring police forces to address civil disorder around the globe. America is the only nation with the necessary level of long range expeditionary capability and capacity to serve this need, as has been demonstrated numerous times, from the Berlin Airlift in 1948/1949, to the Tohoku earthquake and tsunami flood relief efforts in Japan in 2011.

The aerospace and defense industry in the U.S. has been supported by the free enterprise system of business in a nation with a highly educated and skilled workforce, in comparison to many other countries. This model has created and maintained an increasingly efficient and enterprise value creating industry, whose workers today enjoy one of the highest average wages compared to many other industries. This industry not only creates value in the financial sense, it has enabled low cost and safe travel for billions of people, bringing them closer together for face to face human contact.



It also has contributed defense and security technologies to address and defeat adversaries in armed conflict and during security campaigns that have continuously reduced casualties, reduced collateral damage and kept our war fighters out of harm's way.

Study process

The process for conducting this study involved defining the scope and developing a methodology for calculating the economic and financial measures that form the basis of our findings. The methodology involved assessing the various traditional data sources as well as determining methods for closing the gap on discrepancies that we found. We relied on a primary data source, made adjustments and extrapolations and filled in gaps where required.

Scope

Our scope included not only commercial and military aircraft as traditionally viewed, but also naval platforms, military land vehicles, arms, armaments, defense contracting services and several other categories of employment. The following U.S. based categories specifically were included in our study:

- Military, civil passenger, freight and general aviation aircraft, spacecraft, launch vehicles, military land and naval platforms, missiles, munitions, arms and armaments;
- Command, control, communications, computing, intelligence, surveillance, reconnaissance (C4ISR), security, mission software and government contracting services; and
- Other related supply chain portions of the industry.

It should be noted that other studies conducted of the industry have been more expansive in nature. For instance, in August of 2011 the FAA conducted a study measuring the economic impact of civil aviation on the U.S. economy. The scope of the FAA's study included not only air transportation and supporting services as well as the indirect impacts resulting from the expenditures of air passengers, but also aircraft, aircraft engines and parts manufacturing (aerospace). Similarly, other studies conducted at the state level have included military maintenance depots or airline repair centers within their scope.

On the other hand, other studies conducted of the industry have only included military and commercial aircraft and space launch activities within their scope.

Thus it is important to note the activities included within the scope of this study primarily focus on the industry that serves the government defense industry as well as the commercial aircraft, general aviation and commercial space (ex. NASA) industries. Airlines and government employees are excluded from the scope of this study.

Methodology

Our methodology encompasses a primary approach, with enhancements that address known discrepancies. It focuses on 2010 data, but also includes historical data where they were available. Differing sources, sometimes conflicting, result in varying citations of employment. We used three different estimating methods to compare and contrast our findings, in order to provide a higher fidelity analysis.

Bureau of Labor Statistics approach

The BLS was our primary source for employment and wages data on a state by state basis for the aerospace and defense industry. We analyzed a universe of 29 North American Industry Classification Codes (NAICS) that represent companies directly involved in aerospace and defense manufacturing or in aerospace and defense-related services industries. These codes range from aerospace products and parts manufacturing (NAICS code 33641), to search and navigation equipment (NAICS code 334511), to companies engaged in operating a naval shipyard (NAICS code 336611). Certain codes included a non-aerospace and defense component not included in the scope of this study, and in these instances we applied an algorithm to adjust the data as appropriate.

For select NAICS codes, some states displayed intermittent data, had non-disclosed data gaps, or had lack of presence in a particular industry. In order to identify the data for intermittent gaps, we extrapolated an annual growth rate for the national level of employment in that particular NAICS code. Non-disclosed data gaps were estimated by distributing the number of employees based on weights assigned to such states. In certain instances, where data were not available from BLS but available from the Census Bureau, we used data from the latter. For a detailed description of our BLS approach methodology, please refer to the section entitled, 'Detailed methodology.'

BLS data are based on a survey of a sample of establishments that operate in the U.S. An employment benchmark is used to adjust the estimates from the sample. Benchmark data are obtained from information from States unemployment insurance tax records.

State by state citations

A second method for estimating industry employment involved gathering citations from states. We conducted research focusing on state government and associated agency sources to identify specific states which published state-wide aerospace and defense industry employment figures. Our objective was to identify the aerospace and defense industry employment and calculation methodologies available in the public domain. Sources included government and agency websites, reports, statistics, brochures, and research papers.

Additionally, we contacted various state agencies to define the specific methodology used in calculating aerospace and defense employment. We compared each state aerospace and defense industry employment number with our BLS approach to determine specific differences in employment levels as well as their industry scope and calculation methodology.

We found that the majority of the states that published aerospace and defense industry employment numbers defined the aerospace and defense industry using one or more NAICS codes, and the majority of states which published aerospace and defense industry employment numbers used BLS data. For a detailed state by state comparison, please refer to the section entitled, 'Methodology reconciliation.'

Bottom-up industry financial assessment

A third estimating technique was to develop a bottom-up methodology for estimating national aerospace and defense employment and revenue using the analysis in Deloitte's "2010 Global Aerospace & Defense industry performance wrap-up" (Wrap-Up), for purposes of comparing these with our BLS approach and state by state citations. In essence, we reviewed the public SEC filings of listed companies to ascertain the number of employees as well as revenues associated with the scope of this study.

In performing this comparative analysis, several adjustments were required to normalize for the purpose of equivalent comparisons. Firstly, we calculated composite "expatriate ratios" for U.S. and non-U.S. companies based on the U.S. share of total aerospace and defense employment for each of the largest U.S. and non-U.S. companies to ascertain employees and revenues that are attributed to U.S. activity. We applied the respective composite expatriate ratios to the aerospace and defense revenue and employment levels of the 105 global companies analyzed in the Wrap-Up to determine the U.S.-based aerospace and defense revenue and employment levels.

Similarly, we determined the aerospace and defense revenue and employment levels of companies not included in the Wrap-Up (such as privately-owned companies, government controlled establishments, etc.) and applied composite expatriate ratios to these. Where only revenue or employment data were available for such companies, we determined the missing values by using region-specific revenue per employee ratios from the Wrap-Up.

In comparing our findings with the Wrap-Up analysis, we found that the bottom-up, company by company analysis resulted in a higher level of aerospace and defense employment in the U.S. compared to the figure calculated using the BLS approach. Possible explanations for this difference include the following:

- The BLS survey has a more restrictive definition of aerospace and defense activity than Deloitte’s Wrap-Up analysis;
- The BLS survey may not be comprehensive in terms of the number/kinds of companies surveyed;
- Companies may not be responding to BLS surveys or are assigning NAICS codes to revenue at their own discretion, which may result in the potential misclassification of revenue;
- Companies may be withholding revenue/employment data from survey; and
- U.S. affiliates of non-U.S. companies may not all be included in the BLS survey.



Findings of financial and economic impact at U.S. national level

Our study findings focused on the level of direct and indirect employment, the various federal and state income related cash taxes paid by companies and their employees, impact on GDP, and contributions to exports. Our findings associated with beneficial impacts to the industry that are not directly accounted for in these metrics, are also included at the end of this section of our study.

Employment by job classification

We counted the number of employees working for companies whose primary business is to support the aerospace and defense industry in the U.S. serving their customers, primarily the U.S. Department of Defense (DOD), NASA, and commercial airlines. Other customers might include direct-to-home television broadcast, data and voice communications providers, and other government agencies such as National Oceanic and Atmospheric Administration

Figure 1: Employment numbers by industry classification¹

NAICS Codes	2005	2006	2007	2008	2009	2010	Changes in employment from 2005 to 2010
Aerospace products and parts manufacturing (33641)	458,525	476,492	492,714	507,987	497,310	480,668	22,143
A&D related services ²	288,679	302,617	312,291	320,764	309,238	310,836	22,157
Manufacture of search, detection, navigation, guidance, aeronautical and nautical systems and instruments (334511)	159,241	160,886	158,340	155,537	151,436	147,519	(11,722)
Establishments engaged in operating a shipyard (336611)	63,342	65,735	71,044	74,274	71,326	67,128	3,785
Ammunition manufacturing except small arms (332993)	11,215	10,686	10,512	10,322	10,214	10,229	(986)
Military land vehicles manufacturing (336992)	10,596	11,895	14,722	19,116	22,034	19,801	9,205
Radio and television broadcast and wireless communication equipment (334220)	8,543	8,853	7,242	7,585	7,254	7,175	(1,368)
Ordnance manufacturing (332995)	5,319	5,812	6,328	6,967	7,405	6,962	1,643
Small arms ammunition manufacturing (332992)	152	160	156	136	149	158	6
Small firearms manufacturing (332994)	146	141	148	152	150	143	(2)
Grand total	1,005,759	1,043,277	1,073,499	1,102,841	1,076,516	1,050,618	44,859

(NOAA), Department of Homeland Security (DHS), individuals or companies purchasing private general aviation aircraft, etc. These employees are those working in the U.S. regardless of the employer's country of origin; e.g., UK, French, Italian and other non-U.S. aerospace and defense company employees in the U.S. were counted. However, we did not count U.S. registered company employees working outside the U.S.

We found that the U.S. aerospace and defense industry, as broadly defined in the scope of this study, employed 1.05 million workers directly in 2010. Industry employment grew at a nominal CAGR of less than 1% (0.88%) over the period from 2005 to 2010 across all employment classifications - on essentially a flat growth curve, adding about 45,000 employees, or 4% over six years. It should be noted, however, that during this time period, the U.S. DOD budget increased from \$401.7 billion to \$663.8 billion,³ at a CAGR of 10.6%, while commercial airline demand increased at a CAGR of 0.35% as measured by growth in revenue passenger miles (RPM's).⁴

On a related note, we found that total U.S. employment levels from 2009 compared to 2010 decreased by a nominal 25,898 jobs, or 2.4%, possibly reflecting the pending defense budget discussions and potential program cancellations or reductions in units delivered. This was the scenario despite a pending upturn in the commercial aircraft sector and its related supply chain networks. This decrease in employment can be partially attributed to several high profile reductions in force by several major defense contractors, which we have noted in the section entitled, 'Current state of the U.S. aerospace and defense industry,' of this report for reference.

The job category with the largest percentage increase in employment since 2005 is

manufacturers of military land vehicles (BLS NAICS code 336992). The job category with the largest percentage decrease in employment is manufacturers of radio and television broadcast and wireless communication equipment (BLS NAICS code 334220). Figures 1 and 2 illustrate the direct employment levels stratified by BLS NAICS job categories, from 2005 through 2010, sorted from highest to lowest total employee numbers, as well as largest gainers and losers since 2005.

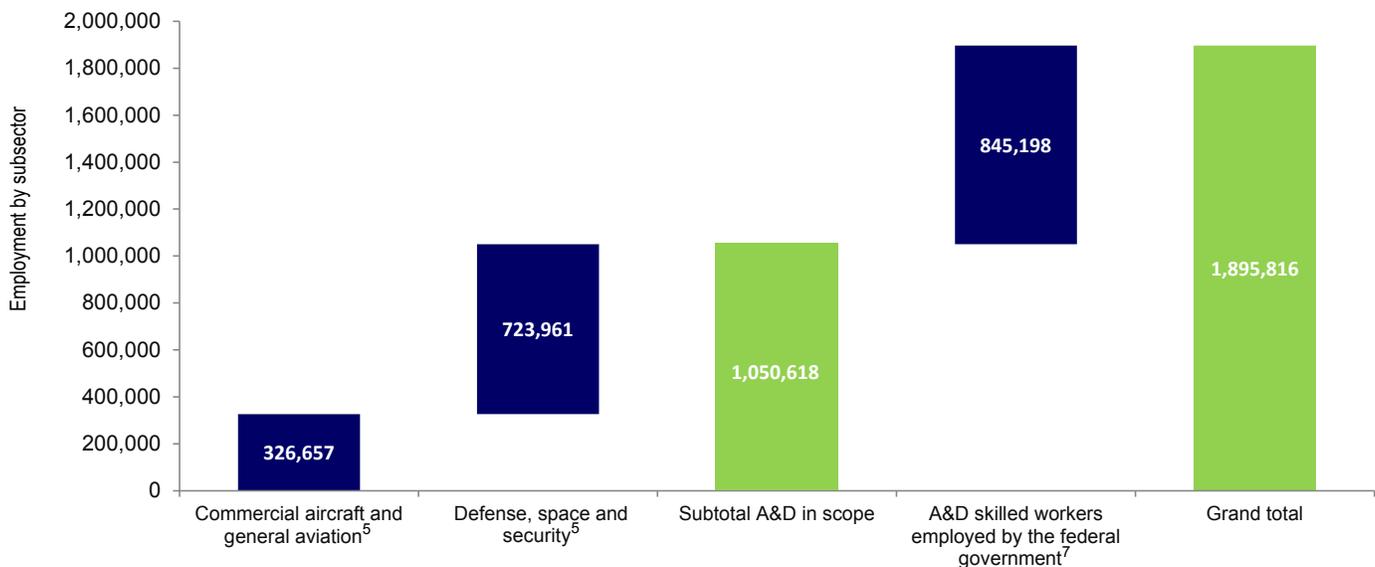
Figure 2: Employment growth by industry classification (% gain/loss)¹

NAICS Codes	CAGR 2005-2010
Military land vehicles manufacturing (336992)	13.3%
Ordnance manufacturing (332995)	5.5%
A&D related services ²	1.5%
Establishments engaged in operating a shipyard (336611)	1.2%
Aerospace products and parts manufacturing (33641)	0.9%
Small arms ammunition manufacturing (332992)	0.8%
Small firearms manufacturing (332994)	-0.3%
Manufacture of search, detection, navigation, guidance, aeronautical and nautical systems and instruments (334511)	-1.5%
Ammunition manufacturing except small arms (332993)	-1.8%
Radio and television broadcast and wireless communication equipment (334220)	-3.4%
Grand total for the industry	0.9%

Employment by subsector

We found that employment in the aerospace and defense industry is generally segregated into the following subsectors: a) commercial aircraft and general aviation; b) defense, space and security; and c) industry-skilled workers employed by the U.S. Federal government, such as at NASA, DARPA and armed forces maintenance and repair depots. The first two subsectors are populated with employees working for private, non-profit and registered public companies. We found that 68.9% of total industry employment is in the defense, space and security subsector.⁵ Although not in the scope of this study, it is notable to also measure employees working outside commercial companies who have traditional aerospace and defense industry skills, e.g., in engineering, test & evaluation, maintenance and overhaul, airframe and power plant (A&P) mechanics, space launch technicians, etc.⁶ Figure 3 illustrates employment in 2010 in these three categories.

Figure 3: 2010 employment by subsector



Industry payroll

Total aerospace and defense industry payroll in the U.S. in 2010 amounted to \$84.2 billion. Although wages were found in each state, industry wages were concentrated in states with the highest number of employees, as would be expected. We also found wages in each NAICS job category, with the majority of wages concentrated in categories with the highest number of employees. Figure 4 illustrates the top ten NAICS categories with the highest total payroll. Figure 48 in the section entitled, 'Detailed tables and charts,' provides a comprehensive list of aerospace and defense payroll by industry classification.

Figure 4: A&D industry payroll by industry classification (top ten)⁸

Industry	Payrolls
Aerospace products and parts manufacturing (33641)	\$40,368,929,098
Search, detection, navigation and guidance systems manufacturing (334511)	\$14,211,885,581
Engineering services (541330)	\$9,406,435,657
Research and experimental development services (541710)	\$6,960,504,675
Shipbuilding (336611)	\$3,840,762,596
Providers of operating staff for support services at client sites - such as janitorial and trash disposal services (561210)	\$1,749,770,736
Computer related services (541519)	\$1,195,221,053
Military land vehicles manufacturing (336992)	\$1,165,970,974
Software services (541511)	\$748,272,174
Ammunition manufacturing - except small arms (332993)	\$693,927,189

Average wages

We found that average wages for employees in the U.S. aerospace and defense industry have been increasing, at a CAGR of 2.7% from 2005 to 2010. We also found that average wages are higher, compared to many other industries in the U.S. Figure 5 compares average wages for several selected benchmarked industries in the U.S. for 2010.

As can be seen, the average wage for the entire aerospace and defense industry in 2010 was \$80,175 across all NAICS job categories within the scope of this study. The highest average wage of \$96,339 was in the search, detection, navigation and guidance systems manufacturing industry (BLS NAICS code 334511). The lowest average wage of \$19,115 was in the sector providing services for cleaning the interiors of military aircraft (BLS NAICS code 561720). This compares with the U.S. national average wage of \$44,410. The detailed listing of all categories is included in Figure 45 of the section entitled, 'Detailed tables and charts.' Figure 6 illustrates the top ten paying job categories in the industry.

Figure 5: 2010 comparison of average wages across selected industries⁸

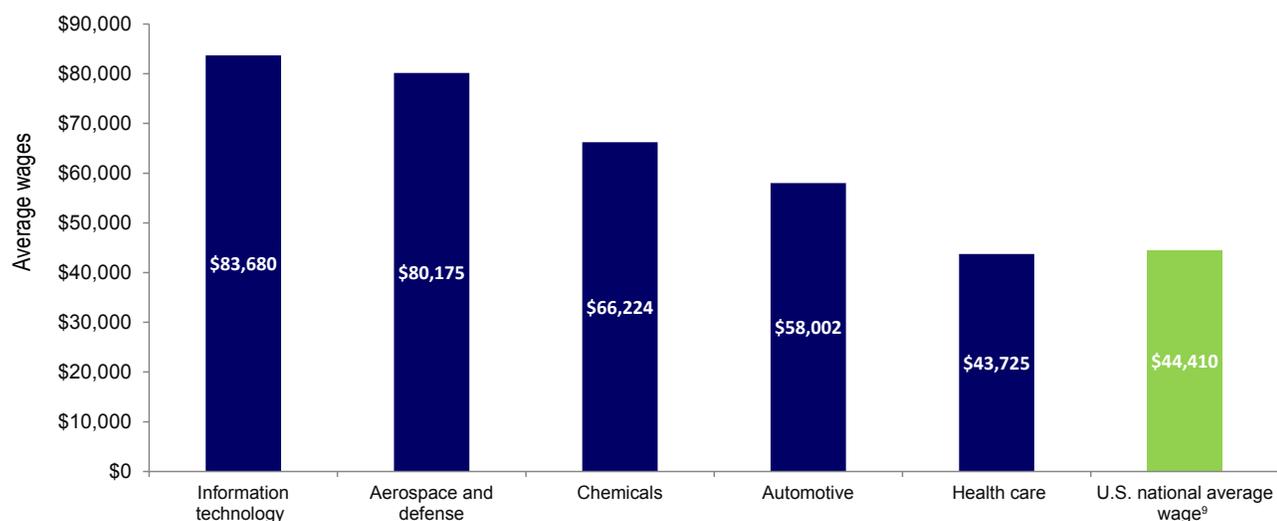


Figure 6: Average A&D wages by industry classification (top ten)⁸

NAICS Codes	2005	2006	2007	2008	2009	2010
Search, detection, navigation and guidance systems manufacturing (334511)	\$84,046	\$86,980	\$89,740	\$91,147	\$93,946	\$96,339
Software services (541511)	\$83,693	\$87,986	\$90,868	\$92,508	\$91,997	\$95,972
Designing computer systems (541512)	\$79,922	\$83,615	\$88,036	\$88,018	\$88,772	\$92,401
Radio and television broadcast and wireless communication equipment manufacturing (334220)	\$77,051	\$80,868	\$82,857	\$82,693	\$86,276	\$90,005
Research and experimental development services (541710)	\$85,868	\$89,130	\$89,349	\$89,295	\$89,001	\$89,103
Aerospace products and parts manufacturing (33641)	\$72,879	\$78,073	\$78,766	\$79,684	\$81,570	\$83,985
Computer related services (541519)	\$70,409	\$72,927	\$76,252	\$78,667	\$79,134	\$83,801
Engineering services (541330)	\$68,411	\$72,425	\$76,108	\$79,183	\$81,473	\$83,359
Management consulting services (541618)	\$72,518	\$77,103	\$78,366	\$83,146	\$79,533	\$83,109
Data processing services (518210)	\$64,047	\$67,574	\$73,088	\$73,923	\$76,281	\$79,315

Foreign ownership

It should be noted that the U.S. aerospace and defense industry has increasingly become global, with American companies not only selling abroad but setting up operations in other countries. On the other hand, foreign companies, principally from Europe, have increasingly become part of the U.S. aerospace and defense industry by purchasing companies or establishing U.S. subsidiaries to gain a foothold in the largest defense market in the world. Indeed in our study, we found that 10.8% of the sales revenue and 10.2% of the employment in our industry are attributed to companies that are foreign-owned. Regardless, these employees are part of the American aerospace and defense industry, the vast majority of which are U.S. citizens due to security clearance requirements in the defense, space and security subsector.

Sales revenue

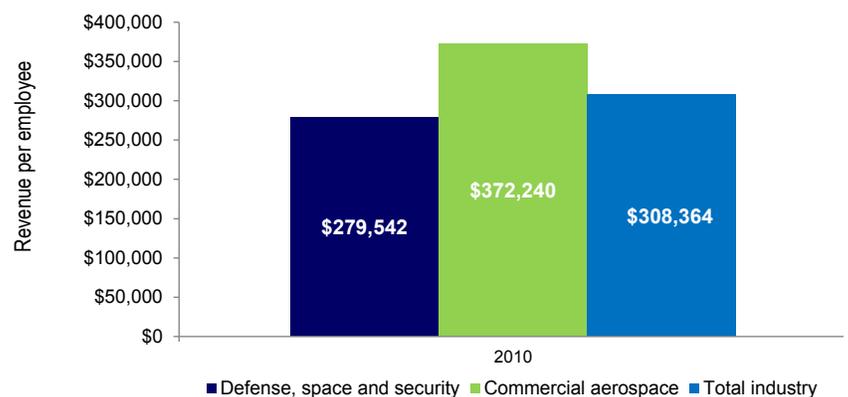
We found that sales revenue from privately-held and publically listed U.S. aerospace and defense firms was an estimated \$324.0 billion in 2010. The revenue estimates for 2010 were arrived at by applying the growth rate of 1.9% on the 2009 figures.¹⁰ This amounts to a \$6.0 billion increase in revenues over the figures for 2009.

Of this, \$202.4 billion, or 62.5%, is estimated to be related to the defense, space and security subsector, with the remaining \$121.6 billion related to the commercial aircraft, general aviation and the nascent commercial

space subsector.⁵ The 50 largest aerospace and defense companies, based on U.S. activity, independent of national origin, represent an estimated 91.8% of the total revenues in the industry. Bear in mind that these numbers related to their aerospace and defense activities, to the extent that these companies also generate revenues in non-aerospace and defense activities.

Also bear in mind that the U.S. DOD purchased in the range of \$370 billion in products and services in 2010, of which approximately \$200 billion was for services.¹¹ The gap between this sales revenue metric (\$202.4 billion) and the citation of U.S. DOD purchases (\$370 billion) is due to the sales of products and services not provided by the U.S. aerospace and defense industry, but by companies that fall into the indirect and

Figure 7: Revenue per employee by subsector⁵



induced employment category, e.g. fuel, food, construction, etc.

When considering the productivity of the industry, it may be worth noting that total industry employment did not increase at the same pace as industry revenue growth or marketplace growth, as cited previously. We did combine our analysis of total industry revenues with total industry employment to determine revenue per employee. This may be useful for the current industry dialogue concerning reductions in the defense marketplace, as well as the increases in the commercial aircraft marketplace. The average revenue per employee in 2010 was \$308,364, a 4.4% increase over 2009 levels.

Figure 7 illustrates the average revenue per employee generated in the total industry, commercial aerospace as well as in the

defense, space and security marketplace in the U.S. in 2010.

Taxes paid

There are several types of cash taxes that public and private companies as well as individuals pay to various tax jurisdictions in the U.S. We analyzed several sources to estimate the cash taxes paid. We found that the most significant cash taxes paid by corporations are Federal corporate income taxes, state corporate income taxes or their equivalents, employer payroll taxes comprised of social security, Medicare and unemployment taxes (FICA and FUTA), excise taxes and property taxes.

On the other hand, we found that the most significant cash taxes paid by individuals employed by the industry are Federal individual income taxes and Federal employee payroll taxes (i.e. FICA - social security and Medicare taxes). Only taxes based on wage income were included in the study scope as data necessary to estimate these taxes were publically available.

In summary for 2010, we estimate that aerospace and defense industry companies paid \$14.1 billion in federal, state and other taxes. We also found that employees of the industry paid \$23.7 billion in federal, state and other taxes. Thus the grand total income related taxes paid by companies and their employees is estimated to be \$37.8 billion. These do not include indirect or induced employee taxes, which could be substantial. Additional taxes not included relate to retail sales and property taxes, which are imposed at the state and city level.



Corporate taxes

The following chart illustrates the cash taxes paid by aerospace and defense companies to Federal and state governments which are within the scope of this study. As can be seen from Figure 8, we found that total corporate taxes paid have increased at a CAGR of 7.4% from 2005 to 2010. The most significant taxes paid by corporations are federal income taxes, followed closely by the social security component of FICA.

Figure 8: Corporate taxes¹²

Type of tax	2005	2006	2007	2008	2009	2010
Federal corporate income tax	\$2,963,373,805	\$4,125,743,017	\$6,541,350,305	\$5,571,278,797	\$5,431,316,660	\$5,534,511,677
Social security tax	\$4,372,264,080	\$4,780,450,104	\$5,009,823,538	\$5,220,200,068	\$5,215,523,761	\$5,222,439,818
State business income tax totals	\$1,077,136,721	\$1,318,412,858	\$1,798,620,830	\$1,670,240,286	\$1,623,440,654	\$1,658,851,188
Medicare tax	\$1,022,545,632	\$1,118,008,492	\$1,171,652,279	\$1,220,853,242	\$1,219,759,589	\$1,221,377,054
FUTA tax	\$436,499,438	\$452,782,102	\$465,898,568	\$478,633,170	\$467,207,975	\$455,968,315
Total corporate taxes paid	\$9,871,819,675	\$11,795,396,573	\$14,987,345,520	\$14,161,205,562	\$13,957,248,640	\$14,093,148,052

Individual taxes

The following chart illustrates the amounts of taxes paid by individuals employed by aerospace and defense companies to Federal and state governments which are within the scope of this study. As can be seen from Figure 9, we found that total individual taxes paid have increased at a CAGR of 5.0% from 2005 to 2010. The most significant cash taxes paid by individuals are federal income taxes, followed by the social security component of FICA taxes.

Figure 9: Individual taxes¹²

Type of tax	2005	2006	2007	2008	2009	2010
Federal personal income tax	\$11,600,866,557	\$13,354,775,661	\$14,267,261,200	\$14,891,423,557	\$15,057,433,519	\$15,429,034,654
Social security tax	\$4,372,264,080	\$4,780,450,104	\$5,009,823,538	\$5,220,200,068	\$5,215,523,761	\$5,222,439,818
State personal income tax	\$1,581,349,214	\$1,709,375,263	\$1,788,146,524	\$1,857,581,997	\$1,853,999,197	\$1,853,900,479
Medicare tax	\$1,022,545,632	\$1,118,008,492	\$1,171,652,279	\$1,220,853,242	\$1,219,759,589	\$1,221,377,054
Total individual taxes paid	\$18,577,025,483	\$20,962,609,520	\$22,236,883,542	\$23,190,058,863	\$23,346,716,066	\$23,726,752,005

Indirect and induced employment

Indirect employment measures how much a sector buys from elsewhere in the economy and calculates a multiplier for the amount of indirect employment created. For instance, an aerospace and defense job is supported by a myriad of jobs in other industries, such as the legal, health care, food service, grocery and consumer retail sectors, which represent the indirect and induced employment resulting from this aerospace and defense job. In other words, for every aerospace and defense job that exists, there is a cascading effect of additional jobs created that can be attributed to that particular job.

We found that for each direct employee of the aerospace and defense industry, there are between 4.67 and 0.40 additional employees which are indirectly employed, with variability principally due to the employee’s geographic location. The reason for the range of employment multipliers is that each state has its own characteristics of wages and job classifications present in its geographies. Thus we have identified employment multipliers for each state, and developed a weighted average total for the nation as a whole. For the entire nation, we found the average employment multiplier was 2.36. This employment multiplier is a “direct effect” multiplier, which accounts for primary and secondary effect employment associated with the aerospace and defense industry. It does not contemplate “final demand,” or employment associated with tertiary effect employment well beyond the direct effect of this industry’s employment base.

Thus, we found that at the national level, indirect and induced employment in the aerospace and defense industry totals 2.48 million jobs. Together with the direct employment described above, grand total employment inclusive of direct and indirect employment is 3.53 million jobs. It should

Figure 10: Indirect and induced employment¹³

NAICS Codes	2010
Aerospace products and parts manufacturing (33641)	1,223,094
A&D related services ²	719,403
Manufacture of search, detection, navigation, guidance, aeronautical and nautical systems and instruments (334511)	356,749
Establishments engaged in operating a shipyard (336611)	95,931
Military land vehicles manufacturing (336992)	36,484
Radio and television broadcast and wireless communication equipment (334220)	26,127
Ammunition manufacturing (33299A)	15,528
Arms, ordnance and accessories manufacturing (33299B)	10,872
Total	2,484,188

be noted that the multiplier analysis assumes that additional workers taken on by a new business were unemployed before, thereby potentially overstating the total employment of a particular industry. The following chart illustrates our findings of the numbers of indirect employment for each job category.

As can be seen from Figure 10, it is not surprising that aerospace parts and products manufacturing has the largest number of indirect and induced employment, at 1.22 million jobs, or almost half of the total industry’s indirect and induced employment. We also conclude that aerospace and defense related services is the second largest employer of indirect and induced jobs, with 719,403 employees, followed by companies that manufacture search, detection, navigation, guidance, aeronautical and nautical systems and instruments, at 356,749 employees.

Export/import

The industry exported \$89.6 billion and imported \$47.5 billion in goods in 2010. According to the Defense Security Cooperation Agency (DCSA), of the \$89.6 billion in goods exported in 2010, \$31.6 billion were foreign military sales.¹⁴ Figure 11 highlights the contribution of the aerospace and defense industry to the U.S.' trade balance in 2010, in comparison with other industries with exports that were greater than \$50 billion. Although the aerospace and defense industry in 2010 was the third highest gross exporter, it had the highest net trade balance, followed by agricultural products.

Figure 11: 2010 comparative analysis of top industry exports and trade balance¹⁵ (\$ in millions)

Industry	Exports	Imports	Net balance
Chemicals	\$171,526	\$187,754	(\$16,228)
Computers and electronic products	\$120,950	\$324,481	(\$203,532)
Aerospace and defense	\$89,636	\$47,484	\$42,153
Petroleum and coal products	\$60,793	\$102,049	(\$41,256)
Agricultural products	\$58,015	\$24,026	\$33,989
Food and kindred products	\$50,901	\$41,025	\$9,876

Figure 12 illustrates the position of the aerospace and defense industry in terms of its contribution to exports by state, for the top ten exporting states. As can be seen, Washington is clearly the leader in aerospace and defense related exports, with more than 25% of industry exports originating from that state. This is not surprising considering that it is the state with the largest presence in the commercial aircraft manufacturing sector. The top five aerospace and defense states account for 55.1% of industry exports. Figures 49 and 50 in the section entitled 'Detailed tables and charts' provides a comprehensive list of state by state exports and imports.

Figure 12: U.S. aerospace and defense exports¹⁵

States	2008	2009	2010
Washington	\$21,701,399,787	\$26,667,661,893	\$23,525,394,393
California	\$9,201,411,502	\$8,072,133,984	\$7,734,658,519
Connecticut	\$6,383,339,252	\$6,327,810,523	\$6,919,282,665
Texas	\$7,060,371,764	\$6,190,070,608	\$6,100,064,143
Florida	\$4,365,335,794	\$4,499,642,930	\$5,149,915,510
Ohio	\$5,050,796,375	\$4,332,553,588	\$5,033,045,693
Georgia	\$3,440,559,510	\$3,569,698,141	\$4,699,126,527
Kentucky	\$4,141,399,973	\$4,777,730,416	\$3,616,627,294
New York	\$3,370,482,608	\$2,994,751,454	\$2,734,960,592
Kansas	\$4,384,261,810	\$2,913,621,638	\$2,173,463,871
Remaining states	\$23,841,084,582	\$21,232,425,726	\$21,949,729,494
Total exports	\$92,940,442,958	\$91,578,100,901	\$89,636,268,701

Contribution to GDP

We found that the aerospace and defense industry has a significant impact on the U.S. economy, with direct industry sales contributing 2.23% to national GDP in 2010. This figure differs from other industry citations, such as an FAA citation that the U.S. civil aviation industry contributed 5.2% to U.S. GDP in 2009. As mentioned earlier, the FAA's study had a different scope than ours. For comparison purposes, we analyzed the direct sales to GDP ratios for different industries based on their NAICS codes.

As can be seen from Figure 13, the aerospace and defense industry has a nominal GDP contribution higher than the primary metal manufacturing industry. It has a similar level of contribution to the automobile and machinery manufacturing industries. Finally, it has a significantly lower nominal GDP contribution than the health care and chemicals industries. We believe the industry has contributions of significance that are not counted in the GDP numbers and that are worth noting, as described in the following

section, entitled, 'Qualitative and non-quantified contributions.'

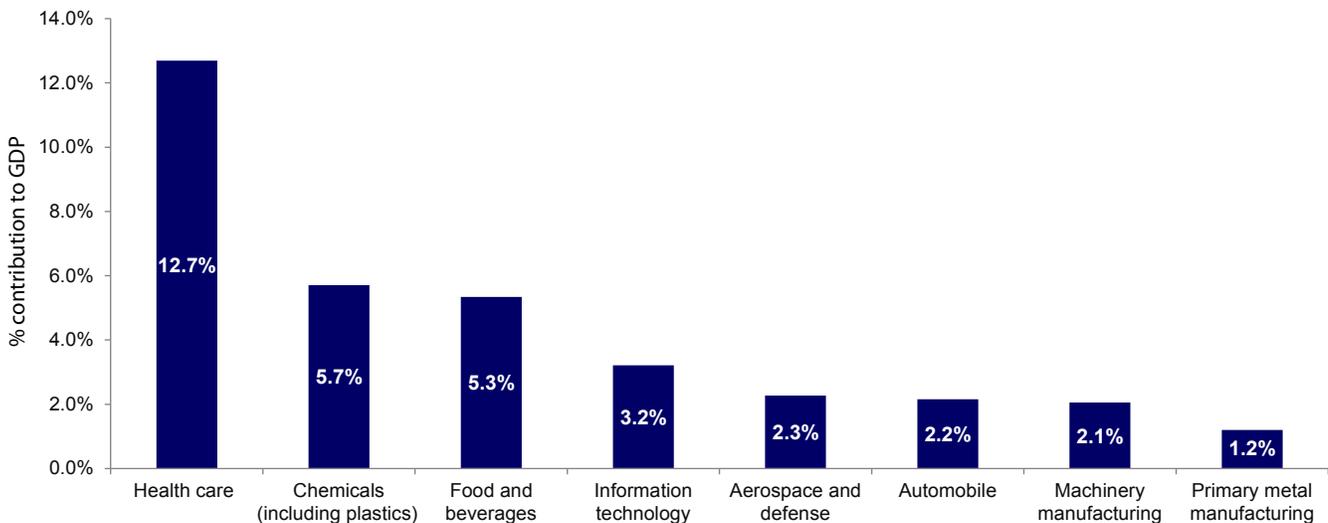
Qualitative and non-quantified contributions

Beyond the financial and economic contributions described in the previous sections, the industry's reach extends beyond what has been quantified or included in GDP, employment, tax or other financial metrics. The industry's impact includes contributions to national security, benefits that other sectors in the economy experience due to technological innovations created in the aerospace and defense industry, financial benefits and others not quantified in this study. The following describe these contributions and impacts in more detail.

Additional employees

As indicated in the earlier sections of this study, our scope did not include employees with aerospace and defense industry skills employed outside of the 29 NAICS codes analyzed. Examples of such employees would be those that repair and maintain KC-135

Figure 13: 2009 GDP contribution of selected key American industries¹⁶



aerial refueling tankers at Tinker Air Force Base in Oklahoma City, the space scientists at NASA, and the engineers performing advanced aerospace studies at the DARPA. For airlines, employees that work at the aircraft maintenance, repair and overhaul facilities for the major airlines in the U.S. were not included.

Finally, our study includes employees that we could verify and count with a consistent and standard process, using BLS data as the primary source. As indicated earlier, the “bottom-up” approach of counting the employees of each aerospace and defense company in the U.S. resulted in an industry employee count above the number that we found using the primary methodology for reasons stated earlier. Thus it is reasonable to assume that our estimate of 1.05 million industry workers is a conservative finding. We do not attempt to include these “gap” employees, to ensure consistency and methodology soundness.

Although not in the study scope, these “gap” employees nevertheless pay Federal and state income taxes, as well as payroll and other taxes which were included in the scope of the study. We do not attempt to quantify, even for illustrative purposes, the amount of taxes that are assumed to be paid by these “gap” employees, although we believe it to be substantial.

Additional taxes not counted

As mentioned earlier, this study quantified cash taxes paid based on corporate earnings and employee wages. At \$80,175, average wages for aerospace and defense industry employees are approximately 81% higher than average wages for the entire U.S. workforce. As such, we assume that state sales tax on taxable retail and consumer purchases to also be substantial. Although not quantified in this study, it is a reasonable

assumption that aerospace and defense employees pay billions in state sales taxes. For illustrative purposes, assume that the average industry employee spends a conservative 25% of earnings on consumer goods. Assuming an average state sales tax rate of 5.7%, on goods purchased would result in employees paying \$1.1 billion to state treasury coffers.¹⁷

Although we did quantify the number of indirect and induced effect employees of 2.48 million due to the multiplier effect, for the purposes of this study, we did not quantify corporate and individual taxes paid by those companies and their employees. A conservative assumption is that these indirect and induced effect employees earn less than direct employees in the aerospace and defense industry, perhaps on an average 50% less than the national average wages of direct aerospace and defense employees. If that were the case, for illustrative purposes we estimate that an additional \$17.7 billion in cash taxes would be paid by these indirect and induced effect employees. Also we did not calculate the state sales taxes for the same reasons described above. If we used the same assumptions above, this would result in an additional \$1.3 billion in state sales taxes paid by indirect and induced effect employees.

Lastly, this study did not quantify sales and use taxes, utility taxes and other taxes that are not wage or corporate income based, because of the difficulty in capturing precise and reliable quantifiable data. Thus at a minimum, not even counting these taxes, nor the taxes presumed to be paid by industry employees not within the scope of this study, but inclusive of the taxes paid by indirect and induced effects employees, these taxes would total \$19.0 billion.¹⁸ Together with direct taxes quantified above for corporations as well as employees within the scope of this study, the

grand total estimate for cash taxes paid is \$58.0 billion.

Reductions in casualties in armed conflict

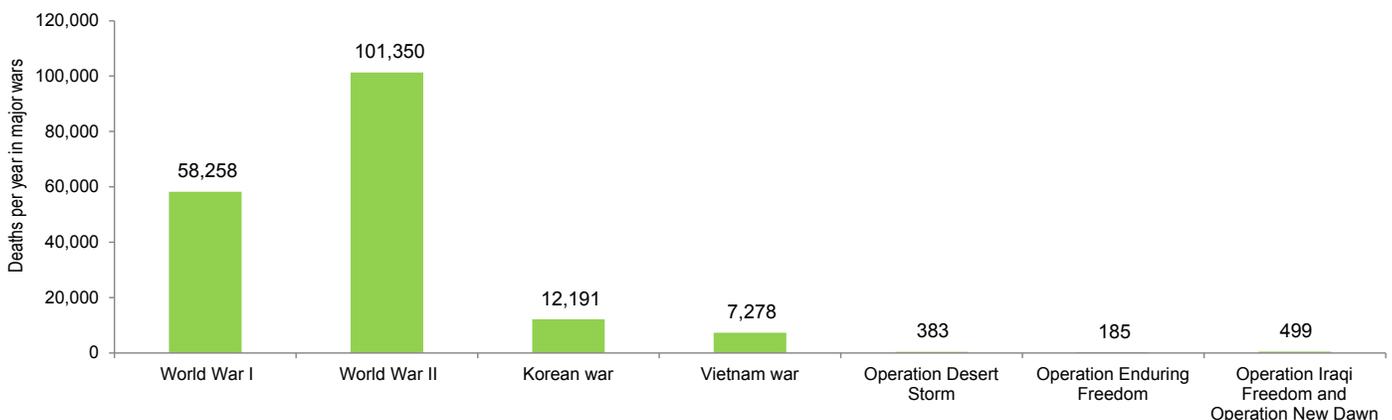
Human casualties resulting from armed conflict have been declining over time, especially with the advances in health care, but principally due to the technology innovations created and improved upon in the aerospace and defense industry. In World War I, U.S. servicemen casualties were estimated to be 116,516 deaths over two years. In World War II, technology advances helped improve our military capabilities, but casualties still reached total estimated deaths of 405,399 in four years. The Korean War saw 36,574 deaths in three years. In the Vietnam conflict, there were an estimated 58,220 deaths in eight years. The deaths in the first Gulf war (Operation Desert Storm) were 383. With the second Iraq war (Operation Iraqi Freedom and Operation New Dawn), there were 4,487 deaths in nine years (till mid December 2011) and in Afghanistan (Operation Enduring Freedom), 1,846 deaths have been reported so far in ten years (till mid December 2011), a significantly different situation. Figure 14 illustrates the reduction of casualties in armed warfare over time.

Modern technology innovations such as cruise missiles, GPS, C4ISR, laser guided munitions, stand-off weapons, multi-spectral sensors and air superiority have made armed conflict more effective with fewer casualties as a result. Fewer warfighters are put in harm's way because adversaries can be fought with unmanned vehicles and precision strikes can disable them from over the horizon. Clearly the innovations in technology derived from this industry have benefited the U.S., but again this benefit is not directly accounted for in the employment, taxes paid and GDP metrics described previously.

Increase in national security

The world continues to demonstrate how dangerous it is and how our civilization and way of life can be put in jeopardy quickly. The surprise attacks on Pearl Harbor and the tragic events surrounding the terrorist attacks of 9/11 have shown our nation how vulnerable it can be. Technology innovations and products developed in the aerospace and defense industry have made our nation safer, from sophisticated sensors that can "see" nefarious activities of our adversaries, to the bomb and metal detectors that have become ubiquitous at airports around the world, the

Figure 14: Deaths per year in armed conflicts¹⁹



industry continues to innovate to produce the necessary defenses used to increase our national security.

Recent advances to counter the next generation national security threats include for example, sophisticated software to trace bank transactions of terrorists, advanced listening sensors to eavesdrop on communications of known terrorists, and sophisticated sensors to help discover threats at our airports, borders, and seaports.



Of course, the unmanned aerial vehicle (UAV) has been extraordinarily successful in helping to see, then attack if necessary, our adversaries. Lastly, the specter of a potential cyber-attack on our nation’s water, power, transportation or communications infrastructure is cause for alarm, and the industry continues to develop the next generation technologies to address these and future threats.



Safe and efficient air travel

The first flight of the Wright Brothers on December 17, 1903, on American soil, paved the way for continued innovation in air travel that has created conditions to bring mankind face to face with increasing frequency. The aircraft manufacturing industry in the U.S. is the global leader, when considering commercial passenger, commercial freight, business jets and general aviation together. The aerospace and defense industry in the U.S. invented modern day air traffic control, as well as contributed to the extraordinary advances in jet propulsion, aerodynamic design and passenger safety.

Figures 15, 16 and 17 illustrate just some of the advances that have been enabled by technology innovations emanating from the U.S., resulting in more capacity to address increasing travel demand, with safer and more fuel efficient flight. Figure 15 portrays that the demand for air travel increased at a CAGR of 2.3% over the past fourteen years. Aircraft manufacturers are providing customers with safer, more fuel efficient aircraft as a result of the increase in demand. Figure 16 illustrates that commercial jet transportation has become 100% safer since 1990. Figure 17 illustrates that fuel efficiency in jet engines has increased by 125% from 1960 to 2010.

Figure 15: Growth of U.S. passenger air travel²⁰

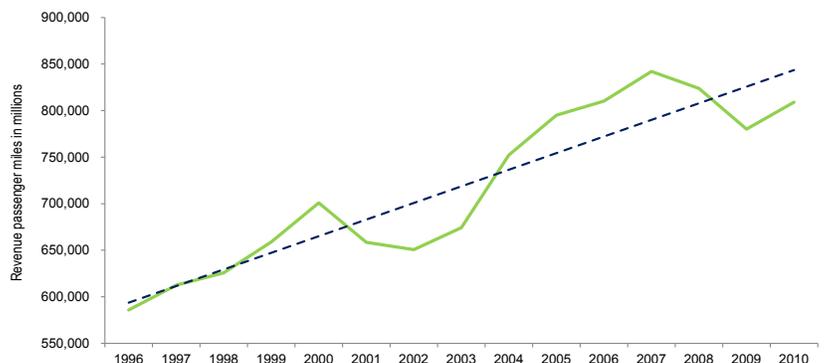


Figure 16: Fatalities per 100 million aircraft miles²¹

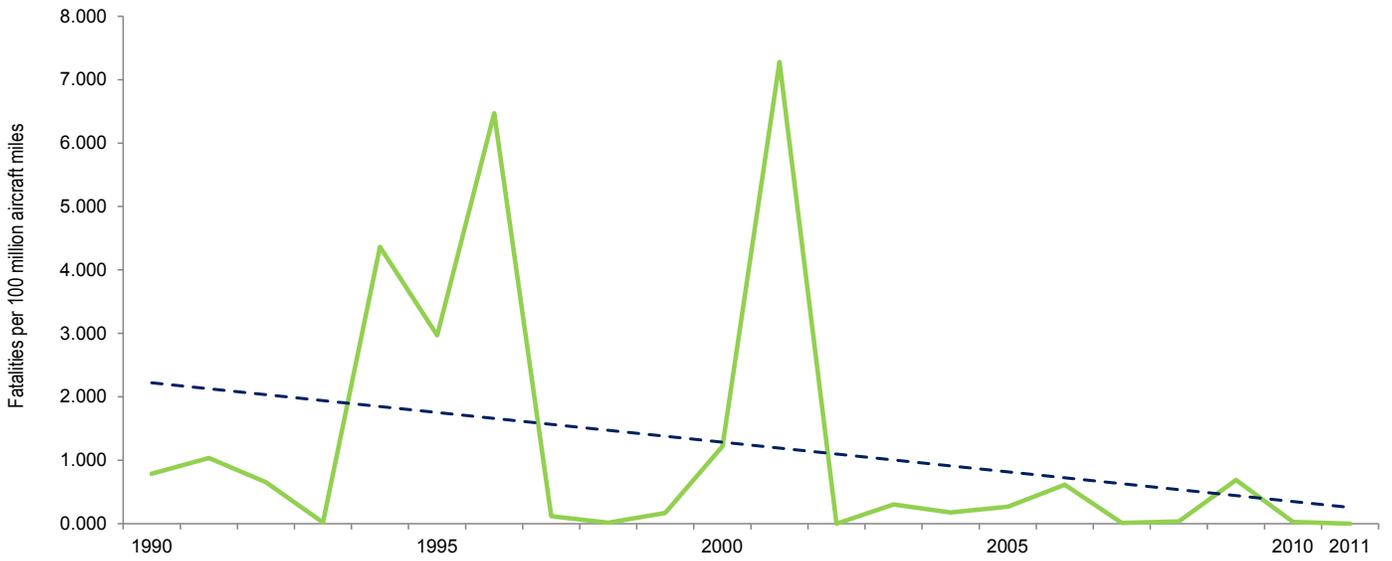
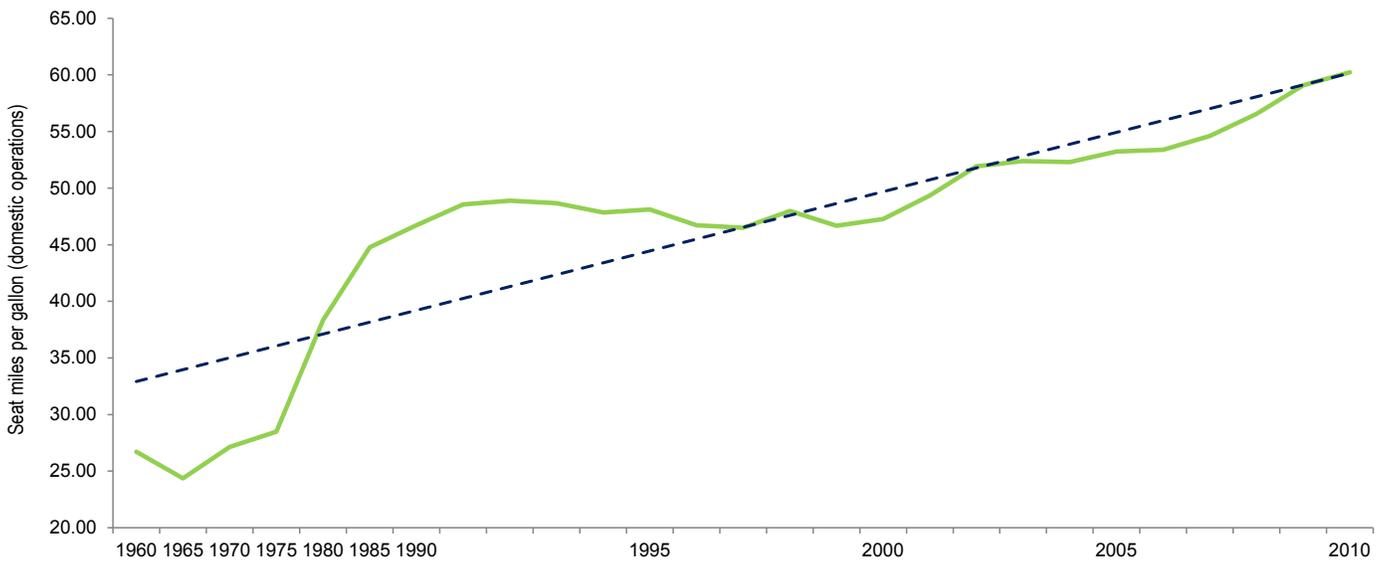


Figure 17: Jet engine fuel efficiency gains since 1960²²



Increased communications and dissemination of knowledge

In 1962, the first television image to be beamed to Earth from a satellite showed a waving American flag. The image was transmitted in the first-ever commercial satellite - an American feat that heralded U.S. leadership in satellite communications. The subsequent launch of TELSTAR, RELAY and SYNCOM, American made communication satellites in the early 1960's, ushered the beginning of a more connected wireless world. It allowed for analog, then digital voice communications previously relegated to low capacity microwave towers and undersea telephone cables. It enabled the first relay of television signals from one ground station to another via space. Ultimately, satellite communications has led to direct-to-home television broadcast, as well as clear signals from personal digital devices connecting people around the world 24 hours by 7 days a week.

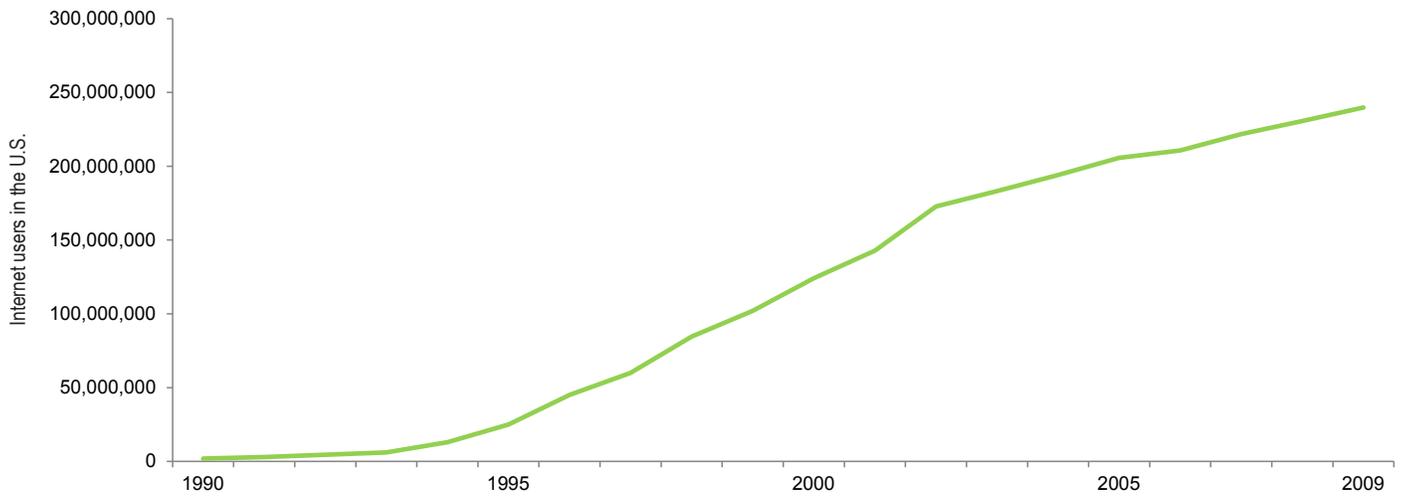
One of the most important technology innovations was the invention of the internet in 1969 by the U.S. government sponsored applied research organization, the Advanced Research Projects Agency (ARPA), the forerunner of DARPA.²³ It has been a game changer in the way people work, learn, shop and live. Today we do not think twice about sending emails with instantaneous receipt anywhere on the planet, shopping on-line for just-in-time delivery at our homes, and even using internet-based voice communications.

Knowledge is shared with ease via the internet, data transfer is simple and inexpensive, and knowledge in the form of data stores and the ability to search has become so easy with search engines. Thus the internet has greatly increased the dissemination of knowledge and has even been touted as a key society enabler, with for example, the success of the Arab Spring movement and change in government in Egypt.²⁴ As indicated by Thomas Friedman, the author of "The World Is Flat," internet communications and its derivatives have become the driving force for equal access to competition through increased knowledge sharing.²⁵

Globalization of supply chain and consumerism

Again due to the invention of the internet and global digital data and voice communications, the ability to connect businesses has become unprecedented, allowing companies to design, manufacture and sell products anywhere, anytime. This has allowed for the global expansion of the supply chain. It also has allowed for the significant increase in consumerism by making products and pricing information available from anywhere in the world. This has given rise to the significant increases in on-line shopping and small package delivery services. Figure 18 illustrates the explosive increase in number of internet users in the U.S., which has enabled internet shopping.

Figure 18: Total internet users in the U.S.²⁶



Scientific research and applied technology advancements

Advances in science and technology have been the lifeblood of the aerospace and defense industry. Due to the advances in rocket and jet propulsion, navigation, aerodynamics and materials sciences, the U.S was able to land a man on the moon in possibly the most visible and iconic moment in the short history of the industry.



Many of the great innovations in science and technology have emanated from the aerospace and defense industry. This can be explained by a number of factors, most significantly the tightly coupled relationship between aerospace and defense suppliers and their customer, particularly the government defense customer. Unlike other supplier/customer relationships, the U.S. government has the resources and capacity to fund the budgets necessary to create scientific and technological advancements.

The industry, especially during the Apollo program in the 1960's, attracted the most talented and skilled engineers to the profession. As computing power has increased exponentially, and the functionality, mission and purpose of the products developed have become significantly more complex, the demands placed on product designers have increased as well. At DARPA, NASA, our nation's National Laboratories and in the test labs of the commercial companies conducting applied research, significant new technology innovations continue to be created. This is in spite of the lack of "allure" once enjoyed by the industry, perhaps as perceived during the run-up to the moon landing in 1969.

As mentioned earlier, and despite the current challenge to attract, recruit, develop and retain the next generation of human capital, the industry continues to create and experiment with technology innovations which form the basis for tomorrow's game changing inventions. Some of the technologies being developed include micro-UAVs, wireless transmission of high voltage electricity, supersonic missiles, directed energy weapons using high power microwave, personal jets, remote controlled commercial jets, electric powered flight, carbon fiber nanotube construction and remote controlled warfare, to name a few.

Findings of economic impact at state level

Employment by state

We found that aerospace and defense employment is concentrated in selected areas of the country, although industry employees can be found in every state of the nation. Indeed, precisely one third of the industry is employed in the top three states. The top seven states with the highest numbers of employees in descending order are California, Washington, Texas, Florida, Arizona, Connecticut and Virginia. These states account for 48.9% of the total industry employment in the U.S. as of 2010. Indeed, the top 20 states account for 80.6% of the total industry employment, lending to the observation that the industry has heavy geographic concentration. Figures 20 and 21 illustrate the state by state employment figures in 2010 by top ten states and by geographic concentration. Figure 39 in the section entitled, 'Detailed tables and charts,' provides a comprehensive list of employment for all states and territories.

Employment by job classification

Employment in the industry varies state by state in terms of the types of aerospace and defense jobs that exist in those states. This is due to the types of companies and the activities those companies are engaged in. For example, Washington has the greatest concentration of employees that are counted in aerospace products and parts manufacturing (BLS NAICS code 33641), due to the commercial aircraft that are built there. Similarly, Virginia has the greatest number of employees engaged in shipbuilding activities (BLS NAICS code 336611), which can be explained because of the concentration of shipbuilding that occurs there. Figure 19 illustrates the states having the highest employment in each industry segment.

Figure 19: State with highest employment by selected industry segment¹

NAICS code	State with highest employment
Aerospace products and parts manufacturing (33641)	Washington
A&D services ²	California
Manufacture of search, detection, navigation, guidance, aeronautical and nautical systems and instruments (334511)	California
Establishments engaged in operating a shipyard (336611)	Virginia
Military land vehicles manufacturing (336992)	Pennsylvania ²⁷
Ammunition manufacturing except small arms (332993)	Texas
Ordnance manufacturing (332995)	Minnesota
Radio and television broadcast and wireless communication equipment (334220)	California
Small arms ammunition manufacturing (332992)	Illinois
Small firearms manufacturing (332994)	New Hampshire

Figure 20: Aerospace and defense industry direct employment by top ten states¹

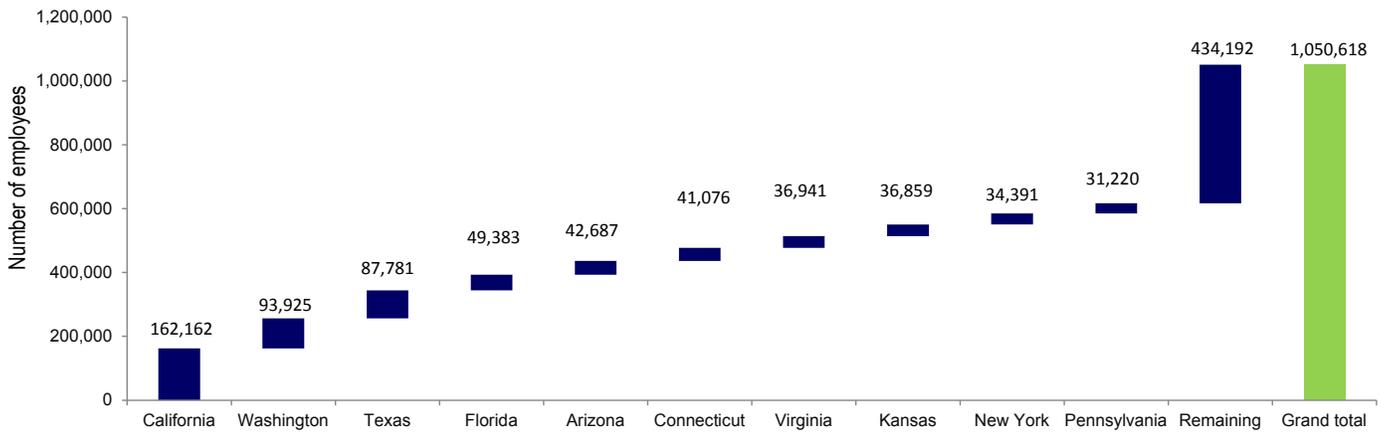
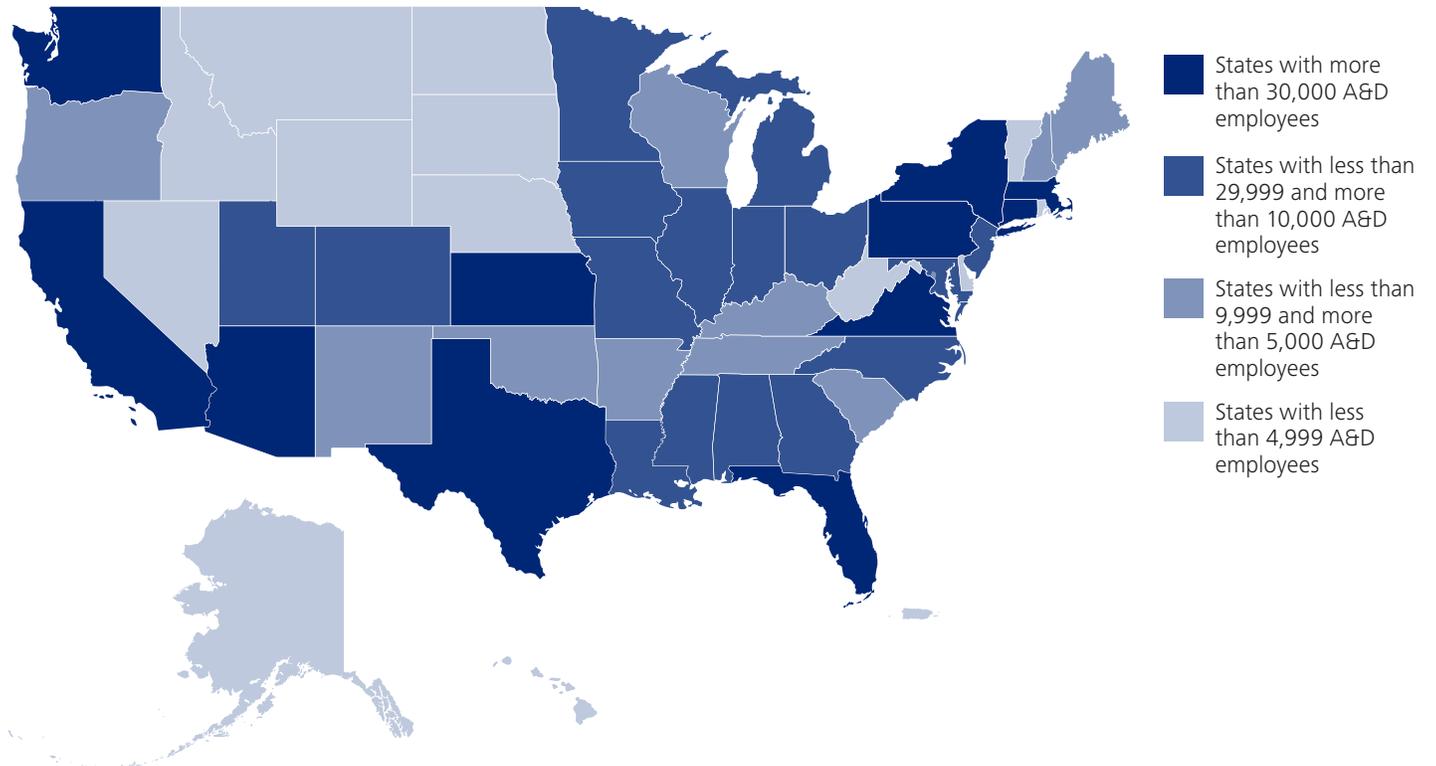


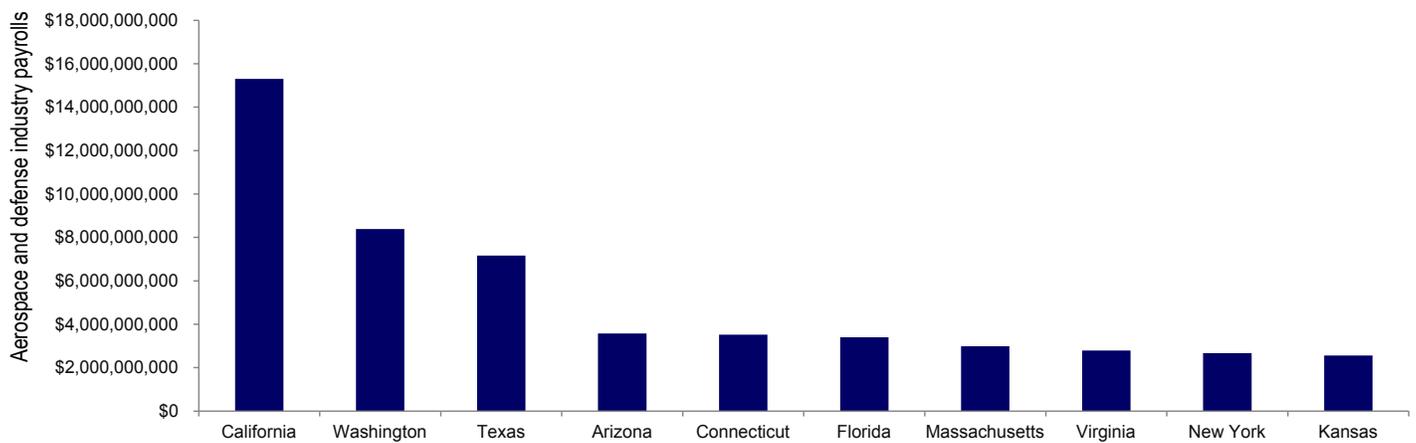
Figure 21: Geographic concentration of A&D employment in the U.S.¹



Industry payroll

Aerospace and defense industry payrolls were highest in California with an estimated \$15.3 billion paid out in wages to employees. The state of Wyoming had the lowest total wages amounting to only \$20.0 million in payroll. Figure 22 illustrates the estimated payroll in the aerospace and defense industry by top ten states. Figure 47 in the section entitled, 'Detailed tables and charts,' provides a comprehensive list of aerospace and defense payrolls by state.

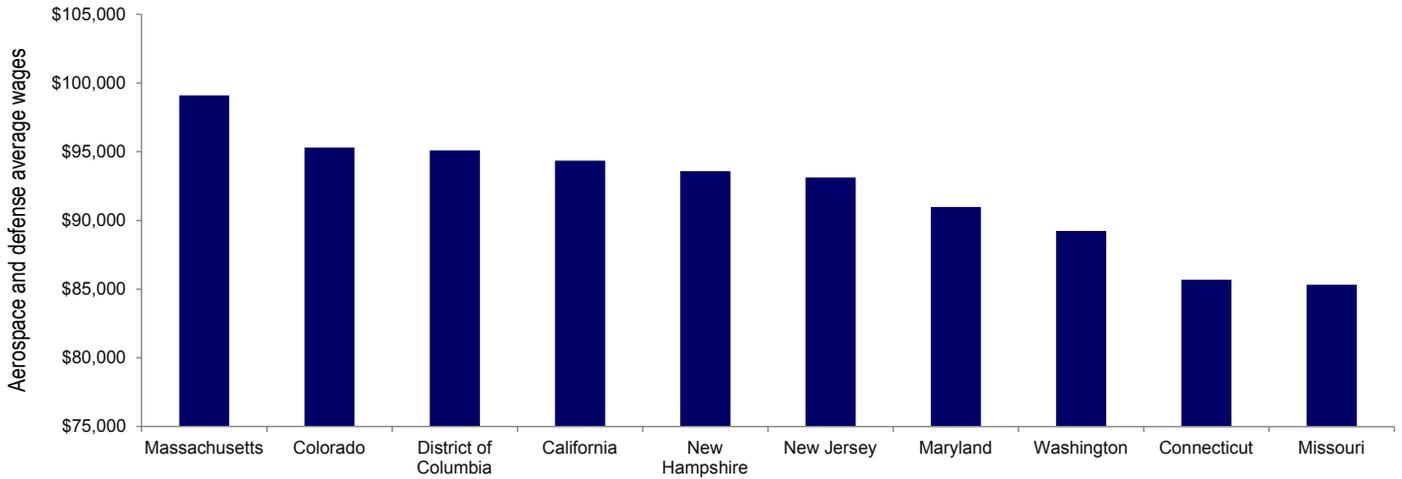
Figure 22: Aerospace and defense industry payrolls by state (top ten states)⁸



Average wages

Massachusetts had the highest average wage of \$99,096 in the industry. Puerto Rico had the lowest average wage of \$22,396 in the industry. Figure 23 illustrates the average wages in the aerospace and defense industry by top ten states, as defined by the scope of our study. Figure 40 in the section entitled, 'Detailed tables and charts,' provides a comprehensive list of average wages by state.

Figure 23: Aerospace and defense average wages by state (top ten states)⁸



Taxes paid

As stated earlier, we found that aerospace and defense companies paid \$1.7 billion in state business income taxes in 2010. The individuals employed by the industry paid \$1.9 billion in state taxes in 2010.²⁸

Corporate taxes

We found that the most significant state cash taxes paid by corporations are corporate income taxes. Six states (Ohio, Nevada, South Dakota, Texas, Washington, and Wyoming) do not levy a corporate income tax; however, Ohio, Texas, and Washington impose a gross receipts or similar business tax. Figure 24 illustrates the types and amounts of taxes paid by aerospace and defense companies to state governments. This chart does not imply a heavier or lighter tax burden for aerospace and defense companies, as it is not weighted by revenues nor employees, just the total amount paid.

As indicated earlier, although companies pay a host of other state taxes, such as property taxes, sales and use taxes and excise taxes, we did not include these in the scope of our study. Figure 42 in the section entitled,

'Detailed tables and charts,' provides a comprehensive list of state business income and gross receipts taxes paid by state.

Individual taxes

We found that the most significant state cash taxes paid by individuals are individual income taxes. Total state individual income tax collections for aerospace and defense employees amounted to \$1.9 billion in 2010. Figure 25 illustrates the state by state breakdown of total individual income tax (state personal income tax) collections. This figure does not imply a heavier or lighter tax burden per employee, only the total state individual income taxes paid.

Although individuals pay other taxes which might be significant, such as property and sales taxes, our study did not include these in our scope. Only taxes based on employee wages were included in the scope of the study as data necessary to estimate these taxes were publically available. Figure 43 in the section entitled, 'Detailed tables and charts,' provides a comprehensive list of individual cash income taxes paid by state.



Figure 24: State business income and gross receipts taxes (top ten states)¹²

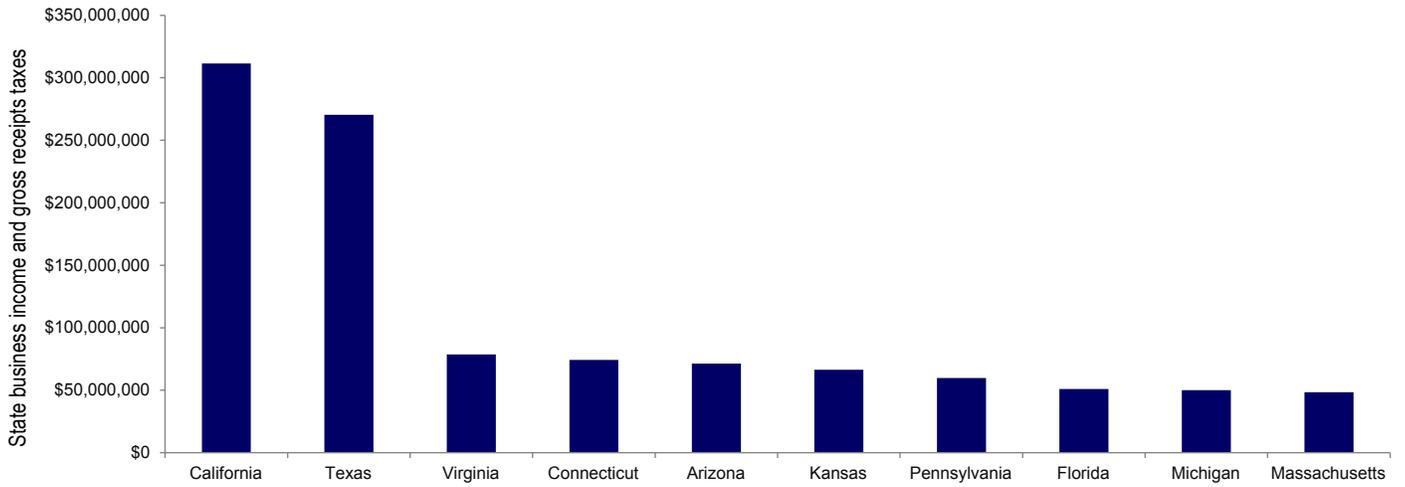
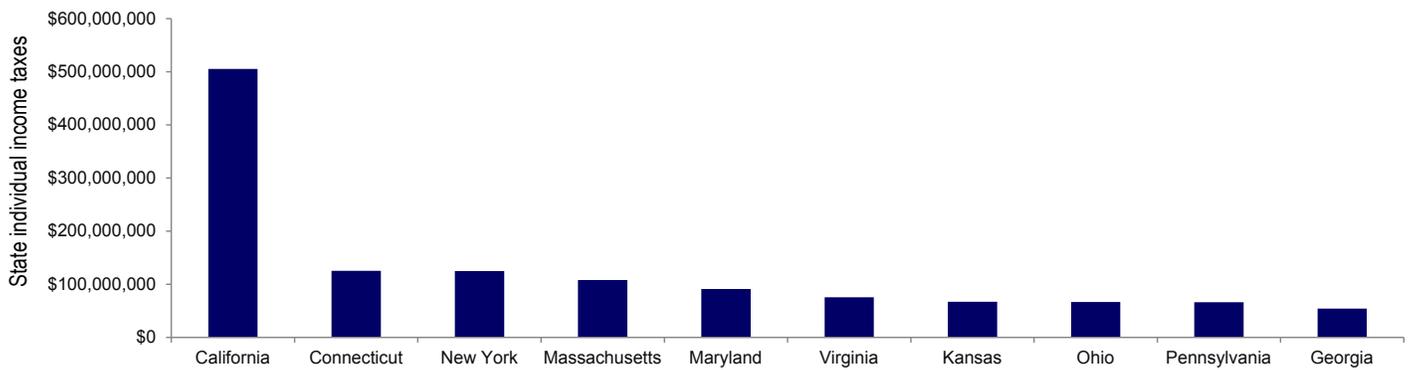


Figure 25: State individual income taxes (top ten states)¹²



Indirect and induced employment

We found that the state of California had the highest total employment of 641,378 in the industry. Figure 26 illustrates indirect and induced employment for the top ten states. Figure 44 in the section entitled, 'Detailed tables and charts,' illustrates direct, indirect and induced employment for all fifty states.

It should be noted that the top ten states with the highest number of indirect and induced effect employees were California, Texas, Washington, Florida, Arizona, Connecticut, Ohio, Massachusetts, Georgia and Virginia. The states with the highest job multiplier effect were Colorado, Ohio and California. This difference is likely to be explained by the different supply chain dynamics in these states. Colorado, for instance, has a heavy military presence with four military command centers, six major space contractors and several industries involved in space research. Thus, the trickle-down effect of any change in direct effects is large.²⁹ The Ohio Department of Development specifically states that a majority of the companies in the sector supply materials or machine parts. This results in a higher value for the multiplier in Ohio, for example.³⁰

As indicated earlier, indirect and induced employment is created to support aerospace and defense industry jobs. For example, the aerospace and defense industry boom times to support the war efforts during World War II were key drivers of economic development in the Washington Puget Sound area as well as the Southern California metropolitan areas, a time when around 12,700 B-17 bombers were produced.³¹

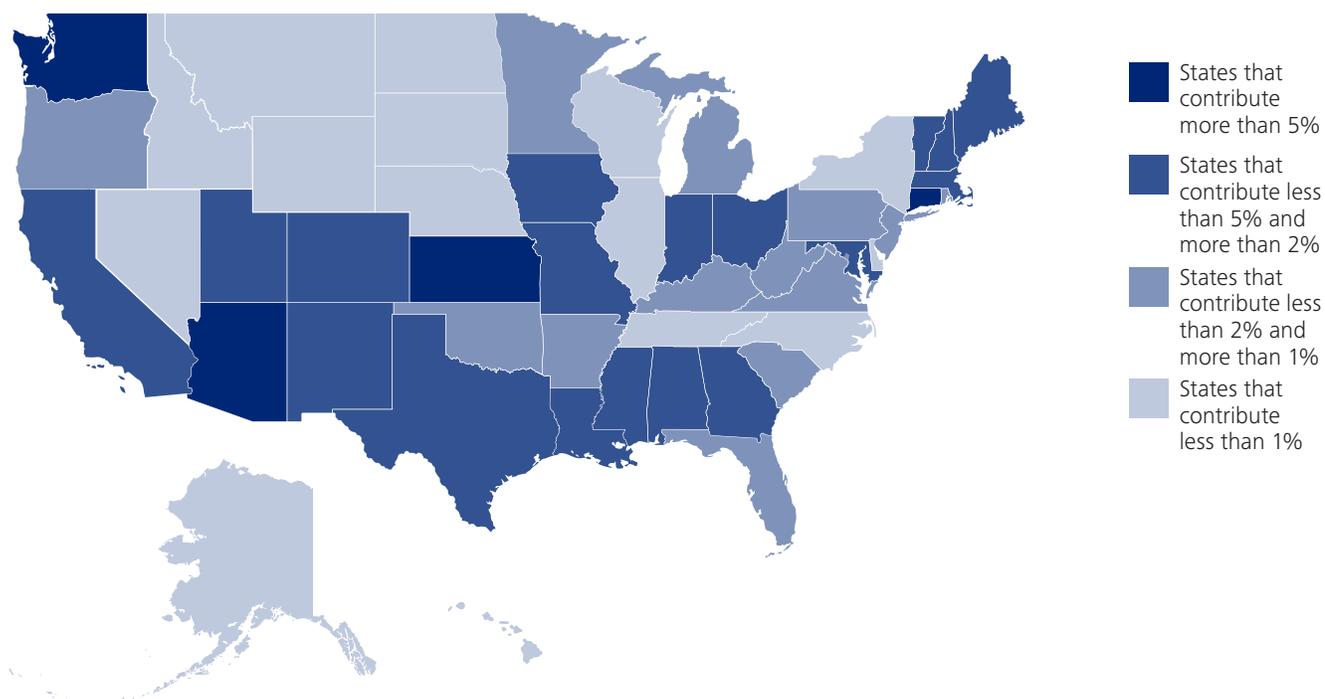
Contribution to state GDP

We found that states with heavy reliance and concentration of aerospace and defense employment as a percentage of total statewide activity exhibit a high industry GDP. We found that Kansas had the highest aerospace and defense contribution to state GDP (current dollar GDP values of 2010 were used). Figure 27 illustrates the geographic reliance (GDP %) of the aerospace and defense industry in the U.S. The top five states with the highest contribution to their respective state GDPs are Kansas, Washington, Arizona, Connecticut and Alabama. Figure 46 in the section entitled, 'Detailed tables and charts,' illustrates the contributions of the aerospace and defense industry to state GDP.

Figure 26: Direct, indirect, induced and total impacts of the A&D industry by top states³²

States	Direct employment in A&D industry	Indirect + Induced employment in A&D industry	Direct + Indirect + Induced employment in A&D industry
California	162,162	479,216	641,378
Texas	87,781	254,156	341,937
Washington	93,925	242,712	336,637
Florida	49,383	118,023	167,406
Arizona	42,687	110,797	153,484
Connecticut	41,076	90,516	131,592
Ohio	28,157	89,434	117,591
Virginia	36,941	76,494	113,434
Massachusetts	30,171	79,385	109,556
Kansas	36,859	68,998	105,857
Remaining states	441,475	874,459	1,315,934
Grand total for the U.S.	1,050,618	2,484,188	3,534,807

Figure 27: Geographic reliance (GDP %) of A&D industry in the U.S.³²



Current state of the U.S. aerospace and defense industry



As can be seen in Figure 28, and according to data obtained from a study conducted by the Aerospace and Defense Industries Association of Europe, the second and third largest markets are Europe and Canada, with Europe controlling a significant market share of 35.9% of total global revenues and 36.0% of total global employment. Brazil and Japan represent a less significant percentage of world revenues and employment, with a combined 5.0% and 4.0%, respectively. Although not included in the scope of the referenced study above, other countries and regions also have aerospace and defense related employment, such as Mexico, Russia, China, Poland, Czech Republic, South Korea and others.

This section compares and contrasts the industry to other geographic regions globally as well as assesses the financial performance metrics within and compared to other key industries, as a way to put its economic contributions in context.

Compared to aerospace and defense in other global regions

The U.S. aerospace and defense industry is the largest in the world, comprising 53.9% of the total global revenues and 53.8% of total employees working for publically held industry companies. The U.S. is also the largest industry market in the world, primarily with the U.S. government, but also with commercial airlines and the general aviation community.

Financial performance metrics

U.S. based aerospace and defense companies had essentially flat financial performance in 2010 when excluding one-time charges. Several operating performance metrics – operating earnings, operating margins and ROIC – grew in 2010, mostly due to the one-time charges taken in 2009 that were largely absent in 2010. Figure 29 illustrates key financial performance metrics for the industry in 2010 compared and contrasted with the performance of other key industries.

Figure 28: Global aerospace and defense employment and revenues³³

Distribution of A&D revenues by country/region

Distribution of A&D employees by country/region

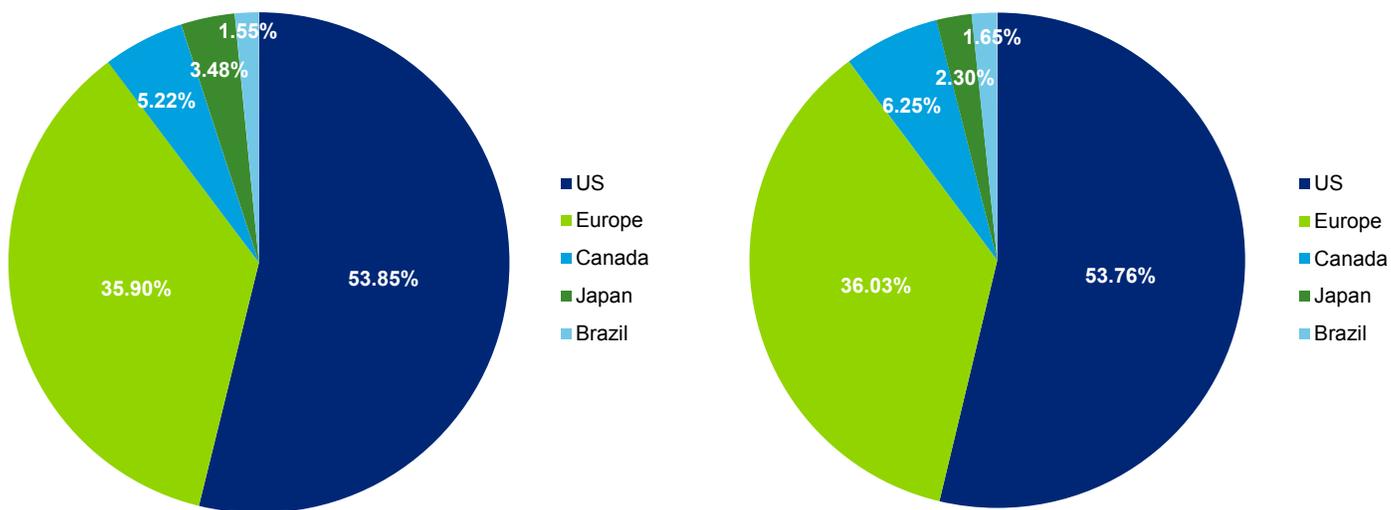


Figure 29: 2010 U.S. A&D core financial performance metrics (\$ in millions)³⁴

A&D performance metrics	Nominal value	Growth
Revenue	\$323,972	1.9%
Core operating margin	10.7%	8.2%
Free cash flow	\$33,347	-8.5%
Free cash margin	6.0%	-12.5%
Return on invested capital (ROIC)	17.3%	-8.2%
Book-to-bill	0.98	20.8%

Comparison to other key industries

The U.S. aerospace and defense sector, compared to other industries, has performed below average in terms of revenue growth, operating margin and industry profit per employee. Figures 30, 31, 32 and 33 illustrate a comparative analysis of selected industries in the U.S. in 2010:

Figure 30: Selected comparative industry analysis of reported operating margin³⁵

Industry	2010
Information technology	20.8%
Metals and mining	19.5%
Chemicals	16.2%
Health care	15.3%
Machinery	14.3%
Auto and components	11.0%
Aerospace and defense ¹⁰	10.5%
Total average ³⁶	18.2%

As can be seen from Figure 30, the aerospace and defense industry performed below average when compared to other industries in 2010. The average operating margins in the aerospace and defense industry were 42% lower than the average for the total U.S. industry in 2010. The information technology (“IT”) industry appears to earn twice as high operating margins as the aerospace and defense industry, which performed more in line with the auto and components industry in 2010.

Figure 31: Selected comparative industry analysis of revenue growth³⁵

Industry	2006	2007	2008	2009	2010
Metals and mining	13.2%	3.6%	7.7%	-34.8%	29.9%
Chemicals	7.2%	6.0%	3.1%	-23.4%	18.2%
Machinery	10.6%	12.2%	16.1%	-25.8%	16.8%
Information technology	7.8%	7.7%	2.5%	-8.3%	16.1%
Auto and components	-2.4%	-1.1%	-12.4%	-31.9%	14.6%
Health care	8.4%	3.5%	7.3%	2.8%	6.0%
Aerospace and defense	6.4%	21.4%	7.1%	-2.6%	1.9%
Total average ³⁶	7.6%	5.8%	1.0%	-10.5%	9.4%

The aerospace and defense industry is not growing nearly as much as the total average U.S. industries, as can be seen in Figure 31. According to a 2010 revenue growth ranking of selected U.S. industries, the aerospace and defense industry is growing at a slower pace than the metals and mining, chemicals, machinery, information technology, auto and health care industries.

Figure 32: Selected comparative industry analysis of profit per employee³⁵

Industry	2006	2007	2008	2009	2010
Information technology	\$27,029	\$27,231	\$13,315	\$27,433	\$40,622
Chemicals	\$30,275	\$32,495	\$28,963	\$24,556	\$36,196
Metals & Mining	\$56,893	\$35,323	(\$10,925)	\$13,513	\$34,897
Health care	\$27,991	\$27,249	\$27,793	\$34,142	\$31,738
Machinery	\$19,483	\$23,248	\$13,551	\$6,424	\$18,474
Auto & components	(\$12,003)	(\$30,645)	(\$36,993)	(\$12,355)	\$16,228
Aerospace and defense	\$11,924	\$16,256	\$14,247	\$14,235	\$14,863
Average	\$24,790	\$20,184	(\$396)	\$12,823	\$23,631

A comparative analysis on profit per employee of selected U.S. industries indicates that the aerospace and defense industry falls below the national average of \$23,631. In fact, as can be seen in Figure 32, the industry generates nearly 63% lower profit per employee when compared with the IT industry. The average profits per employee in the aerospace and defense industry were 37% lower than the average for the total U.S. industry in 2010.

Figure 33: Selected comparative analysis of 2010 employment¹

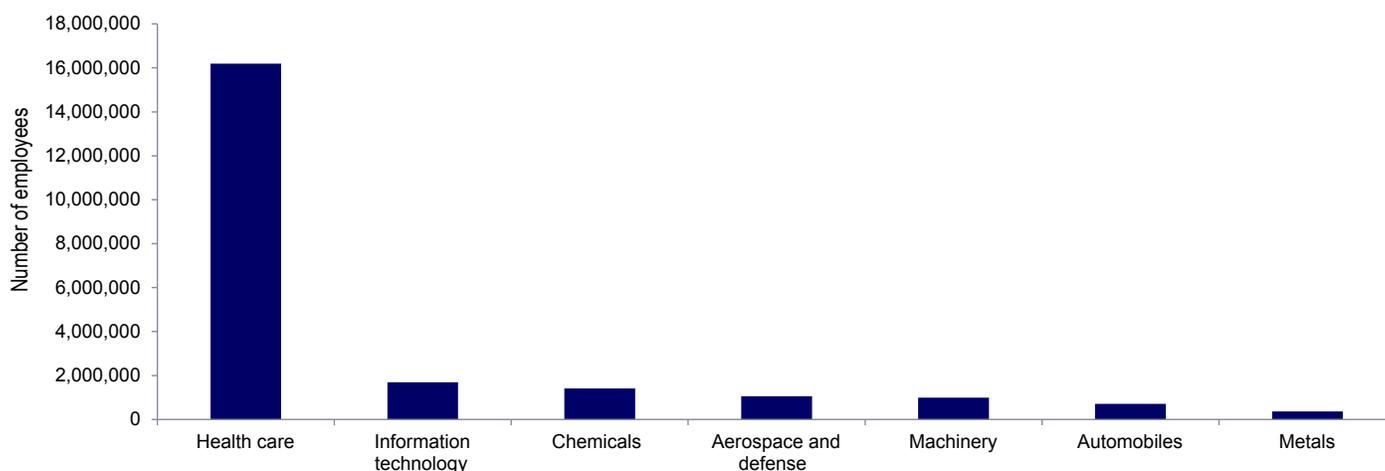


Figure 33 illustrates that aerospace and defense direct employment in 2010 is significantly less than in the health care industry. However, the IT, chemicals and aerospace and defense industries all employed between 1 million and 2 million workers in the U.S. in 2010.

Current challenges

Macro-economic factors had an impact on the aerospace and defense industry in 2010. Among these are the growing pressure on defense budgets, a difficult financial environment, as well as growing competition from new and emerging countries. In the U.S., there is a sense of unease as the DOD's budgets for research, development and procurement are moderating or declining. Pressure to cut costs and to improve efficiency is high, and additional program cuts are expected due to cost overruns or a determination that current or planned weapon systems are no longer needed. Additionally, new program starts going forward look sparse, adding to the sense of unease.

Defense and security

For many defense firms, the new market realities will require innovation, risk taking and bold moves to continue growth in revenues and profitability. Several areas for growth are expected to be in critical emerging and growing product segments, including – cyber security, intelligence, surveillance and reconnaissance, defense electronics, precision targeting and response, remotely controlled platforms, directed energy, data fusion and energy security. Furthermore, given the slowdown in U.S. defense spending, contractors are considering how to replace revenues with growth in adjacent markets and through gap filling, game changing and/or scale building acquisitions. Growth in foreign military sales may also contribute to some revenue growth, but this is yet to be determined.

Commercial aircraft

For commercial aerospace, 2010 marked the beginnings of what appears to be an up-cycle in sales and production, both in the large commercial aircraft segment. Indeed, in

2011, commercial aircraft production reached a record high of 1,011, and sales orders recorded were the second highest ever. With production rate increases being announced by the large aircraft manufacturers, and the introduction of next generation fuel efficient aircraft, the supply base may expect to experience a prolonged growth pattern, if past is prologue. On the other hand, this increase in production activity poses a potential capacity challenge, as suppliers gear up to meet the rate increases.

Space

With the retirement of the space shuttle in 2011, new paradigms in human spaceflight are evolving. For the first time in well over three decades, the United States is developing spaceflight systems to send people beyond Earth orbit. In addition, a number of aerospace companies are developing new, commercially developed systems for astronaut transportation to the International Space Station.

Meanwhile, the national security space sector is currently recapitalizing major satellite systems after years of development work. In light of reduced national security budgets, the challenge is to ensure the health of the industrial base so that irreplaceable skills and capabilities are not lost.

Recent impacts and industry responses

The aerospace and defense industry is reacting to the tectonic shifts and trends, from the DOD budget cuts to the pending upturn in commercial aircraft production. These include cost cutting, layoffs, and outsourcing, principally for defense contractors, to recruiting, rehiring, training

Figure 34: Selected 2010 and 2011 aerospace and defense layoffs

Date announced	Company	No. of jobs cut	Citation and source
Oct-11	Northrop Grumman	800	The Baltimore Sun, "Northrop job cuts highlight economic challenge for state," October 2011
Aug-11	United Space Alliance	800	Washington Technology, "Space Shuttle contractors to shed 1,000 workers," August 2011
Jul-11	United Space Alliance	1,550	Washington Technology, "Space Shuttle contractors to shed 1,000 workers," August 2011
Jul-11	Lockheed Martin	6,500	ABC News, "U.S. Employers With the Largest 2011 Layoff Announcements," September 2011
Jun-11	Boeing	510	Daily Tech, "Boeing issues layoff notices as NASA retires space shuttle program," June 2011
Jun-11	BAE Systems	132	Knoxvillebiz.com, "BAE Systems cuts 132 jobs, may close Jefferson City plant," June 2011
May-11	General Dynamics	112	Insidenova.com, "General Dynamics to layoff 112 in Woodbridge," May 2011
May-11	Northrop Grumman	500	The Baltimore Sun, "Northrop Grumman job cuts come amid defense belt-tightening," May 2011
Feb-11	Rockwell Collins	140	Orange County Register, "Rockwell Collins closing Irvine Plant," February 2011
Nov-10	Northrop Grumman	380	Reuters, "Northrop Grumman Shipbuilding Announces Employment Reduction in Virginia," November 2010
Nov-10	Lockheed Martin	400	Bloomberg, "Lockheed Martin to close Minnesota P-3 Plane facility, cutting 400 jobs," November 2010
Oct-10	United Space Alliance	1,200	CNN, "Shuttle layoffs leave some workers adrift," October 2010
Sep-10	Northrop Grumman	500	LA Times, "Northrop Grumman workers in El Segundo and Redondo Beach brace for cuts," September 2010
Sep-10	ATK Aerospace Systems	426	HJ News, "Hundreds lose ATK jobs in new round of layoffs," September 2010
Aug-10	Boeing	250	Orange County Register, "Boeing cutting 800 Longbeach jobs," August 2010
Aug-10	BAE Systems	1,300	Instant News Fortbend, "BAE Announces Massive Layoffs At Its Sealy Manufacturing Facility," August 2010
Jun-10	Boeing	180	Waff, "Constellation contractor Boeing makes Huntsville job cuts," June 2010
May-10	L-3 Communications	65	Philly.com, "Despite wars, 65 local layoffs from L-3 The Camden defense contractor said it had to curb costs. Lockheed Martin in Moorestown recently cut 126 jobs.," May 2010
Apr-10	Boeing	300	Seattle Times, "Boeing issues layoff notices to 130 in state, 300 companywide," April 2010
Apr-10	Raytheon	225	The Hill, "Layoffs hit defense firms used to profits," April 2010
Mar-10	Northrop Grumman	180	Seattle Times, "Northrop Grumman issues layoff notices to 180," March 2010
Mar-10	BAE Systems	100	News 5, "BAE Systems To Cut Dozens Of Jobs After Contract Lost," March 2010
Feb-10	Boeing	80	Orange County Register, "Boeing cuts 80 jobs in Seal Beach," February 2010
Feb-10	BAE Systems	173	Aerotech news, "Defense contractor closes East Tenn. plant," February 2010
Jan-10	Lockheed Martin	1,200	Forbes, "No sign that the hoped-for jobs turnaround has yet begun.," January 2010

and other job creation actions particularly in the commercial aircraft supply chain.

Layoffs

Defense contractors have responded to potential DOD budget cuts with staff cuts and offers of early retirement. Figure 34 illustrates measures recently taken by the industry to reduce overhead and cut costs. These actions in 2010 resulted in a total of 19,150 jobs being cut in the industry. The continuation of layoffs in 2011 resulted in a total of 34,759 jobs being eliminated. In 2011 the aerospace and defense industry ranked fourth in job cuts.³⁷ However, these job cuts were offset by selected hiring in the industry as well.

Industry consolidation

Industry consolidation continued in 2010, particularly amongst the Tier 1 and Tier 2 suppliers. Larger OEMs sought out gap filling acquisitions to bolster their ability to compete for the “new reality” product

development contracts expected in the C4ISR, unmanned systems, cyber-security and precision strike technologies.

For the commercial aerospace suppliers, horizontal consolidation provides more scale economies, reduced overhead and support costs and increased competitiveness. Companies are carving up their businesses and disposing of those pieces that do not fit with their go forward strategy.

Figure 35 highlights consolidation activity, as measured by merger and acquisition (M&A) transactions announced in 2010 and in 2011 with U.S.-based targets with a publicly disclosed enterprise value greater than \$450 million. The table also highlights the broad range of M&A transaction valuations disclosed within the aforementioned parameters. Many more transactions were announced or completed in 2010 and 2011 that were under that threshold.

Figure 35: Selected 2010 and 2011 aerospace and defense M&A deals (EV > \$450 million)³⁸

Date announced	Seller	Buyer	Business Description	EV (US\$ in m)	EV/ Revenue	EV/ EBITDA
Nov-11	Deutsch Engineered Connecting Devices, Inc.	TE Connectivity Ltd. (NYSE:TEL)	Deutsch Engineered Connecting Devices, Inc. designs and manufactures electrical connectors and fiber optic connectors, and specialized electronics and associated components. The company was founded in 1938 and is based in Oceanside, California.	2,067.1	3.7x	-
Sep-11	Goodrich Corp. (NYSE:GR)	United Technologies Corp. (NYSE:UTX)	Goodrich Corporation supplies aerospace components, systems, and services primarily in the United States, Canada, Europe, and the Asia Pacific. The company was founded in 1912 and is headquartered in Charlotte, North Carolina.	18,123.1	2.4x	12.8x
Aug-11	Vangent, Inc.	General Dynamics Information Technology, Inc.	Vangent, Inc. is a leading provider of health care information-technology and business systems to federal agencies. Vangent, Inc. was founded in 1953 and is based in Arlington, Virginia.	1,299.1	1.8x	14.9x
Jul-11	Primus International, Inc.	Precision Castparts Corp. (NYSE:PCP)	Primus International, Inc. manufactures and supplies aircraft products catering to original equipment manufacturers and suppliers. Primus International was founded in 1998 and is based in Bellevue, Washington.	900.0	-	-
Jun-11	Latrobe Specialty Metals, Inc.	Carpenter Technology Corp. (NYSE:CRS)	Latrobe Specialty Metals, Inc. manufactures and markets steel and fabricated steel alloys for the manufacturing and aerospace industries. The company was founded in 1913 and is headquartered in Latrobe, Pennsylvania.	556.7	1.5x	8.8x
Jun-11	EMS Technologies Inc. (NasdaqGS:ELMG)	Honeywell International Inc. (NYSE:HON)	EMS Technologies, Inc. designs, manufactures, and sells wireless communications products to satellite and wireless communications markets for commercial and defense applications. EMS Technologies was founded in 1968 and is based in Norcross, Georgia.	494.0	1.4x	12.7x
Mar-11	SRA International Inc.	Providence Equity Partners LLC ; Providence Equity Partners VI, L.P.	SRA International, Inc. provides technology and strategic consulting services to the national security, civil government, health care and public health, and intelligence and space markets. The company was founded in 1976 and is based in Fairfax, Virginia.	1,781.5	1.0x	10.9x
Dec-10	Applied Signal Technology, Inc. (NasdaqGS:APSG)	Raytheon Space & Airborne Systems	Applied Signal Technology, Inc. provides intelligence, surveillance, and reconnaissance solutions for the defense, intelligence, and homeland security markets. Applied Signal Technology, Inc. was founded in 1984 and is headquartered in Sunnyvale, California.	476.1	2.1x	14.6x
Nov-10	CPI International, Inc. (NasdaqGS:CPII)	Veritas Capital	CPI International, Inc., through its subsidiaries, provides microwave, radio frequency, power, and control products primarily in the United States, Europe, and Asia.	527.6	1.5x	9.0x

Figure 35: Selected 2010 and 2011 aerospace and defense M&A deals (EV > \$450 million)³⁸ (cont.)

Date announced	Seller	Buyer	Business Description	EV (US\$ in m)	EV / Revenue	EV / EBITDA
Nov-10	Ladish Co. Inc. (NasdaqGS:LDSH)	Allegheny Technologies Inc. (NYSE:ATI)	Ladish Co., Inc. engages in the engineering, production, and marketing of forged and cast metal components for various load-bearing and fatigue-resisting applications in the jet engine, aerospace, and industrial markets.	806.5	2.1x	14.7x
Oct-10	Lockheed Martin Corporation, Enterprise Integration Group	Veritas Capital	Lockheed Martin Corporation, Enterprise Integration Group offers system engineering services, architecture, integration services, and support to a broad range of government customers.	815.0	1.3x	-
Sep-10	McKechnie Aerospace DE, Inc.	TransDigm Inc.	McKechnie Aerospace DE, Inc. engages in the design, manufacture, and logistic support of structural components, systems, and assemblies for the commercial, regional, business, and military aerospace industries in the United States and internationally.	1,797.7	5.7x	19.2x
Sep-10	L-1 Identity Solutions Inc. (NYSE:ID)	Safran SA (ENXTPA:SAF)	L-1 Identity Solutions, Inc. provides technology, products, systems and solutions, and services to protect and secure personal identities and assets in the United States and internationally.	1,585.0	2.5x	22.4x
Jun-10	Argon ST, Inc.	Boeing Co. (NYSE:BA)	Argon ST, Inc. and its subsidiaries provide systems engineering, development, and services in the United States and internationally.	774.7	2.3x	18.1x
May-10	Stanley, Inc.	CGI Federal Inc.	Stanley, Inc. provides information technology (IT) services and solutions to the United States defense, intelligence, and federal civilian government agencies.	1,059.9	1.2x	11.6x
Apr-10	DynCorp International Inc.	Cerberus Capital Management, L.P.	DynCorp International Inc. operates as a government services provider in support of U.S. national security and foreign policy objectives offering support solutions for defense, diplomacy, and international development.	1,439.2	0.4x	5.6x
Mar-10	Vought Aircraft Holdings, Inc.	Triumph Group, Inc. (NYSE:TGI)	Vought Aircraft Holdings, Inc. manufactures aero structure products for commercial, military, and business jet aircrafts.	1,587.0	0.8x	-
Feb-10	Insight Technology Incorporated	L-3 Communications Holdings Inc. (NYSE:LLL)	Insight Technology Incorporated develops and produces night vision and electro-optical systems.	613.0	-	-
				Mean	2.0x	13.5x
				Median	1.6x	12.8x

Conclusions

The U.S. aerospace and defense industry has been a leader in its contribution to product innovation, bringing people all over the world into contact with each other with safer and lower cost air travel and communications. It has created the technology that successfully addresses national security and helps defend the U.S. It continues to create marvels of science and technology such as airplanes that turn into helicopters, high definition pictures from space, and remote controlled armed conflict. It continues to create the technology innovations that power the economy with our just-in-time, internet-based commerce.

The industry also has a large contribution to the U.S. economy, responsible for fully 2.23% of GDP and 7.0% of exports in 2010, and is the largest net exporting industry in America.³⁹ With direct, indirect and induced employment of 3.53 million jobs spread over the entire U.S., as well as contributing an estimated \$37.8 billion in tax collections benefiting local communities, state treasury coffers and the federal government, this industry is part of the very fabric of our country's well-being. Indeed we conclude the industry punches above its weight, when considering qualitative contributions cited.

With significant pressures to lower the budgets for defense, therefore potentially the revenues and employment by private defense contractors, there may be a potential negative impact on the industry's capacity to continue to develop the innovations and technologies that have powered its first century. While aerospace and defense companies are addressing their needs for profitable growth with, for example, foreign military sales, acquisitions and growth in adjacent markets, a significant reduction in DOD spending may potentially negatively impact company funded research and development, thus the innovations and technology advances we would have expected over the coming decade.

This study might be informative to congressional policy makers, administration and higher education officials and commercial industry representatives to take stock of the contributions of the aerospace and defense industry to America's economy past and present. These contributions should be top of mind in light of the short and long term implications of potential actions that might be taken to address the U.S.' defense affordability and global commercial market competition.

Frequently asked questions

1. Are airline MRO services included in the scope of the current study?

Answer: Complete aircraft overhaul and rebuilding has been considered in the scope of our study, under NAICS code 336411. However, because the code pertains to manufacturers only, it includes factory conversions, overhaul and rebuilding and does not include airlines or other non-manufacturing companies providing MRO services.

2. How does the study scope compare and contrast with what the AIA traditionally has defined as “Aerospace” in their year-end studies?

Answer: AIA has traditionally defined aerospace products and parts manufacturing (NAICS code 33641) and search and navigation equipment (NAICS code 334511) as “Aerospace.” The scope of the current study includes the above two industries and establishments engaged in manufacturing and providing services related to military land vehicles (NAICS code 336992), military ships and water based vehicles (NAICS code 336611), arms used by the military (NAICS code 332994 and 332995), ammunitions used by the military (NAICS codes 332992 and 332993), defense broadcast and wireless communications equipment (NAICS code 334220) and other services purchased by the armed forces (several NAICS codes pertaining to industries providing services to the A&D sector).²

3. Has NASA been considered in this report?

Answer: NASA has not been included in the scope of the current study because the organization is comprised of government employees.

4. Does the study include the military depots that repair and overhaul military aircraft, ships, and army equipment?

Answer: The study does not include military depots that repair and overhaul military aircraft, ships and army equipment because they are government employees. Private contractors performing military depot work are included.

5. Why do some states report different industry employee numbers than this study?

Answer: Different states report different industry employee numbers for the following reasons:

- Traditional definition of the industry – States report employment due to aerospace products and parts manufacturing (BLS NAICS code 33641) and search, detection, navigation and guidance systems manufacturing industry (BLS NAICS code 334511) only
- Specific definition of the industry – State reports employment due to aerospace products and parts manufacturing (BLS NAICS code 33641) only
- Over inclusion of NAICS codes – State includes other NAICS codes while defining the A&D industry
- Total employment – State reports employment figures after considering direct and indirect employment

6. If one was to add up all the employees of A&D companies as disclosed in their annual reports, would the numbers in the study be the same?

Answer: The numbers would not reconcile because the data provided by BLS are based on survey estimates

calculated from payers of Unemployment Insurance (UI) taxes. BLS data covers approximately 97% of private sector and total nonfarm employment. Also, expatriates working in the U.S. subsidiaries of foreign companies may not be included in UI reports.

The following are additional reasons for possible discrepancies of data:

- The BLS survey may not be comprehensive in number/kind of companies surveyed;
- Companies surveyed may not provide an employment breakdown on the basis of NAICS codes;
- Companies may withhold data from the BLS survey;
- BLS survey data used are the average value for the year, while the estimates from companies are based at a moment in time; and

7. Do the commercial employee and revenue numbers include the air transportation industry?

Answer: The air transportation industry, which includes airlines, was not part of our scope and is therefore not included in our commercial employee and revenue figures. The companies that design and manufacture aircraft, as well as their suppliers, are included.

8. Why do the commercial numbers appear higher than the total output of commercial jet and general aviation companies?

Answer: MRO services provided by manufacturers are included in the scope of our study. The sum of revenues generated from MRO services as well as that of the top 100 aerospace

and defense companies in the U.S. equals \$109 billion. Total revenue including smaller, private companies is approximately \$122 billion.

9. Why were BLS data used for employment instead of Census Bureau data?

Answer: The Census Bureau provides national level annual employment statistics only for manufacturing related NAICS codes through its Annual Survey of Manufacturers. State level data were not available for six-digit NAICS codes from the Census Bureau except for the year 2007. Thus, we used BLS data as our primary source for obtaining employment figures, and Census Bureau data as a secondary source.

10. According to a recent study conducted by the FAA, the U.S. civil aviation industry contributed 5.2% to U.S. GDP in 2009.⁴⁰ How does the 2.23% figure cited in this study compare to the FAA citation?

Answer: The 2.23% figure cited in this study is a 2010 calculation of direct industry sales to U.S. GDP, whereas the FAA citation is a 2009 calculation of total value added (including direct, indirect and induced impact) to U.S. GDP. Importantly though, the “aerospace and defense industry” as defined in the scope of this study differs from the FAA definition of civil aviation. The civil aviation industry, as defined by the FAA, includes the following sub-industries:⁴⁰

- Traditional aerospace manufacturing sector: Comprised of two sub-industries: aerospace products and parts manufacturing (BLS NAICS code 33641) and search, detection, navigation and guidance systems manufacturing (BLS NAICS code 334511)

- Air transportation industry: Comprised of passenger and cargo airlines
- Services provided to the air transportation industry: Comprised of the services provided to the airlines (both cargo and passenger airlines)
- Travel and other trip-related expenditures by travelers using air transportation: Indirect impacts resulting from the expenditures of air passengers, other than airfares and associated charges paid directly to airlines or travel arrangers

11. How does the aerospace and defense industry contribution to GDP of 2.23% compare with industry citations of U.S. defense-related expenditures as a percent of GDP of 4.7%?

Answer: The U.S. military budget includes defense-related expenditures incurred by the military for spending on private contractors, government contractors/ service providers, pay packages to soldiers, armed forces welfare schemes, etc. This military budget pays the salaries, training, and health care of uniformed and civilian personnel, maintains arms, equipment and facilities, funds operations, and develops and buys new equipment. The scope of our study covers only the private contractor segment of the defense industry (as well as the commercial aerospace segment) and hence the discrepancy in GDP contribution.

12. Why does the Deloitte study citation for A&D reported operating margin of 10.5% differ from the Compustat/S&P Aggregates citation of 12.9% in Figure 30?

Answer: Compustat/S&P Aggregates includes operating earnings for companies classified as A&D, even

though some of these may have non-A&D businesses. For example, Honeywell International Inc. and United Technologies Corp. are classified as A&D by Compustat/S&P Aggregates, yet these companies have large portions of their business that are not in the A&D industry. Our citation for operating margin excludes the non-A&D parts of such companies.

13. How does the aerospace and defense trade balance estimate from the current study compare to the estimate of \$75 billion cited in the FAA Economic Impact of Civil Aviation on the U.S. Economy study?⁴⁰

Answer: The \$75 billion trade balance cited by the FAA is sourced from the U.S. International Trade Commission (USITC), and is comprised of data for only one industry, namely civilian aircraft, engines, equipment and parts manufacturing (represented by NAICS code 33641X). Because the USITC does not report imports for NAICS code 33641X, the \$75 billion figure represents gross exports for 2009 for only one industry, and does not consider imports for NAICS codes 336411, 336412 and 336413 (both civilian and non-civilian aircraft, aircraft engine and parts manufacturing) while arriving at trade balance. If that were done, the net trade balance would be \$53.4 billion in 2009, and \$50.0 billion in 2010.

The current study is broader in scope and includes other industries, such as non-civilian aircraft, engines and engine parts, small arms manufacturing and radio and television broadcast and wireless communications equipment manufacturing. It also includes some portions of 29 different NAICS codes, which reduces the net trade balance to \$42 billion for 2010.

Detailed methodology

We analyzed a broad subset of the aerospace and defense industry, characterized by a universe of NAICS codes that represent establishments directly involved in aerospace and defense manufacturing or in A&D-related services industries.

Figure 36: A&D Manufacturing NAICS codes

Industry	NAICS Code	Description
Manufacturing	332992	This industry comprises establishments primarily engaged in manufacturing small arms ammunition
	332993	This industry comprises establishments primarily engaged in manufacturing ammunition (except small arms). Examples of products made by these establishments are bombs, depth charges, rockets (except guided missiles), grenades, mines, and torpedoes
	332994	This industry comprises establishments primarily engaged in manufacturing small firearms that are carried and fired by the individual
	332995	This industry comprises establishments primarily engaged in manufacturing ordnance (except small arms) and accessories
	334220	This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment
	334511	This industry comprises establishments primarily engaged in manufacturing search, detection, navigation, guidance, aeronautical, and nautical systems and instruments. Examples of products made by these establishments are aircraft instruments (except engine), flight recorders, navigational instruments and systems, radar systems and equipment, and sonar systems and equipment
	33641	This industry comprises establishments primarily engaged in one or more of the following: <ul style="list-style-type: none"> – Manufacturing complete aircraft, missiles, or space vehicles – Manufacturing aerospace engines, propulsion units, auxiliary equipment or parts- Developing and making prototypes of aerospace products – Aircraft conversion (i.e., major modifications to systems) – Complete aircraft or propulsion systems overhaul and rebuilding (i.e., periodic restoration of aircraft to original design specifications)
	336611	This industry comprises establishments primarily engaged in operating a shipyards. Shipyards are fixed facilities with dry-docks and fabrication equipment capable of building a ship, defined as watercraft typically suitable or intended for other than personal or recreational use. Activities of shipyards include the construction of ships, their repair, conversion and alteration, the production of prefabricated ship and barge sections, and specialized services, such as ship scaling
	336992	This industry comprises establishments primarily engaged in manufacturing complete military armored vehicles, combat tanks, specialized components for combat tanks, and self-propelled weapons

Figure 37: A&D Services NAICS codes

Industry	NAICS Code	Description
Services	511140	This industry comprises establishments primarily engaged in publishing directories, mailing lists, and collections or compilations of fact
	511199	This industry comprises establishments generally known as publishers (except newspaper, magazine, book, directory, database, music, and greeting card publishers)
	517110	This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks
	518210	This industry comprises establishments primarily engaged in providing infrastructure for hosting or data processing services
	541310	This industry comprises establishments primarily engaged in planning and designing residential, institutional, leisure, commercial, and industrial buildings and structures by applying knowledge of design, construction procedures, zoning regulations, building codes, and building materials
	541330	This industry comprises establishments primarily engaged in applying physical laws and principles of engineering in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems
	541511	This industry comprises establishments primarily engaged in writing, modifying, testing, and supporting software to meet the needs of a particular customer
	541512	This industry comprises establishments primarily engaged in planning and designing computer systems that integrate computer hardware, software, and communication technologies
	541513	This industry comprises establishments primarily engaged in providing on-site management and operation of clients computer systems and/or data processing facilities
	541519	This U.S. industry comprises establishments primarily engaged in providing computer related services (except custom programming, systems integration design, and facilities management services)
	541618	This U.S. industry comprises establishments primarily engaged in providing management consulting services (except administrative and general management consulting; human resources consulting; marketing consulting; or process, physical distribution, and logistics consulting)
	541620	This industry comprises establishments primarily engaged in providing advice and assistance to businesses and other organizations on environmental issues, such as, the control of environmental contamination from pollutants, toxic substances, and hazardous materials
	541710	This industry comprises establishments primarily engaged in conducting research and experimental development in the physical, engineering, and life sciences, such as agriculture, electronics, environmental, biology, botany, biotechnology, computers, chemistry, food, fisheries, forests, geology, health, mathematics, medicine, oceanography, pharmacy, physics, veterinary, and other allied subjects
	561110	This industry comprises establishments primarily engaged in providing a range of day-to-day office administrative services
	562120	This industry comprises establishments primarily engaged in providing operating staff to perform a combination of support services within a client's facilities

Industry	NAICS Code	Description
Services	561612	This U.S. industry comprises establishments primarily engaged in providing guard and patrol services, such as bodyguard, guard dog, and parking security services
	561720	This industry comprises establishments primarily engaged in cleaning building interiors, interiors of transportation equipment (e.g., aircraft, rail cars, ships), and/or windows
	561730	This industry comprises <ul style="list-style-type: none"> – Establishments primarily engaged in providing landscape care and maintenance services and/or installing trees, shrubs, plants, lawns, or gardens – Establishments primarily engaged in providing these services along with the design of landscape plans and/or the construction (i.e., installation) of walkways, retaining walls, decks, fences, ponds, and similar structures
	561990	This industry comprises establishments primarily engaged in providing day-to-day business and other organizational support services (except office administrative services, facilities support services, employment services, business support services, travel arrangement and reservation services, security and investigation services, services to buildings and other structures, packaging and labeling services, and convention and trade show organizing services)
	562910	This industry comprises establishments primarily engaged in one or more of the following: <ul style="list-style-type: none"> – Remediation and cleanup of contaminated buildings, mine sites, soil, or ground water – Integrated mine reclamation activities, including demolition, soil remediation, waste water treatment, hazardous material removal, contouring land, and re-vegetation – Asbestos, lead paint, and other toxic material abatement

We applied different approximation methodologies which are explained below to arrive at estimates for various metrics. Metrics calculated to assess the economic impact include employment, wages, GDP, cash taxes paid (income based), revenues by sector, export/import and economic multiplier data.

Aerospace and defense industry definition and removal of non-A&D activities from NAICS codes

The following NAICS codes were used in their entirety covering the aerospace and defense industry: 332993 (manufacturing ammunition except small arms), 332995 (military ordnance manufacturing), 334511 (search, detection, navigation and guidance systems manufacturing), 33641 (aerospace products and parts manufacturing) and 336992 (military land vehicles manufacturing).

The remaining NAICS codes included in our scope performed activities not related to the aerospace and defense industry. In order to calculate the relevant share of aerospace and defense activities in the manufacturing NAICS codes, we used independent third party research to ascertain the percentage of each code that fell under our industry definition.⁴¹ We used these percentage values as downscaling ratios to remove the non-aerospace and defense component.

In order to calculate the relevant share of aerospace and defense work in the services-related NAICS codes, we analyzed defense contract spending by the Army, Navy, Special Operations, Missile Defense Agency and the Air Force.⁴² We used these percentage values as downscaling ratios to remove the non-aerospace and defense component.

Estimating aerospace and defense employment

As mentioned previously, the Bureau of Labor Statistics was our primary source for arriving at employment estimates. Our process involved downloading employment statistics for each state and for all NAICS codes. We then gathered missing data to smooth data gaps.

We focused on the two NAICS codes that traditionally define the aerospace and

defense industry, codes 33641 and 334511. We applied growth rates and determined suitable weights for states with missing data. We used the employment weights in codes 33641 and 334511 as a base for any further estimates in other codes. In certain instances, BLS did not disclose the data required and we used data from the 2007 Economic Census from the Census Bureau. In those instances, we used the upper value of the range mentioned by Census Bureau.

Following the methodology described above, we were able to calculate the missing data for all NAICS codes included in our industry definition for all fifty states. We applied the downscaling ratios described previously to remove non-aerospace and defense activities from the NAICS codes, thereby arriving at the aerospace and defense employment by state for each NAICS code.

Estimating aerospace and defense revenues

We used data from the Census Bureau to estimate annual revenues for the aerospace and defense industry.

In order to calculate revenue for the manufacturing NAICS codes, we obtained national level revenues from the Annual Survey of Manufacturers. We assumed as part of our analysis that the total value of shipments from an industry represents revenues generated. Manufacturing revenues were available from 2005 to 2009. We estimated 2010 revenues by applying a growth rate of 1.9% to the 2009 revenue figures.¹⁰ Further, we removed the non-aerospace and defense activities using same methodology used for estimating employment data. We used employment data to calculate approximate revenue weights for each state, and applied these to the national revenue data gathered to arrive at state level revenue figures.

We obtained revenues for services-related NAICS codes² on a national level from the Annual Services Survey of the Census Bureau. Similar to our process for estimating revenues for manufacturing codes, we used employment data to calculate approximate weights for revenue per state and applied downscaling ratios to remove the non-aerospace and defense component of revenues, where applicable.

Estimating aerospace and defense payroll and average wages

In order to gather aerospace and defense payroll wages, we obtained the average annual state-by-state wage data for each industry NAICS code from BLS. We applied growth rates and a weighting methodology to fill in intermittent gaps in data, thereby arriving at payroll and average wages.

Estimating aerospace and defense exports and imports

The foreign trade division of the Census Bureau reports export and import trade statistics by NAICS code at a national level. We obtained the total value for exports and imports for each manufacturing related six-digit NAICS code⁴³ and state-level trade⁴⁴ information at a four-digit NAICS code level. The Census Bureau does not disclose trade information for NAICS code 332993, pertaining to manufacturing ammunition (except small arms ammunition). Consequently we did not include the trade statistics for this industry grouping in our export and import analysis. For the remaining NAICS codes we removed the non-aerospace and defense activities from the trade values using downscaling ratios, and applied a weighting methodology to arrive at state-level trade information for each NAICS code.

Estimating aerospace and defense taxes

The federal, state and local governments levy different types of taxes on A&D companies

and its employees. We used publicly available data from the Internal Revenue Service (IRS) and Tax Foundation to arrive at estimates for the various taxes.

Federal taxes

We considered the following types of federal taxes:

- Federal corporate income tax⁴⁵
- Social Security tax
- Medicare tax
- FUTA tax (Federal Unemployment Tax Act)
- Individual income tax

Estimating federal corporate income taxes

To calculate federal corporate income tax collections, we used total federal corporate income taxes paid after credits from the IRS for each four-digit NAICS codes.

We scaled down the tax data using a suitable factor to estimate the taxes paid by all A&D industries in six-digit codes. The tax figures obtained for each NAICS code were then added together to arrive at the total federal corporate income taxes paid by the A&D industry.⁴⁶

Since the data availability for taxes paid by four-digit NAICS code was for the period 2005 to 2008, we used a projection method to arrive at the tax estimates for 2009 and 2010. The figures for 2009 were obtained by applying the revenue growth rate during 2008-2009 for each NAICS code. Tax estimates for 2010 were arrived at by applying a growth rate of 1.9% on the 2009 estimates.¹⁰

Estimating social security taxes

Each employer and U.S. employee must pay social security taxes based on the amount of an employee's wages. An employee's contribution to social security taxes is equal

to 6.2% of gross wages received, subject to a ceiling amount that is adjusted annually for inflation, which the employer is required to withhold and remit to the IRS. The employer must make a corresponding contribution to social security taxes equal to 6.2% of that employee's gross wages, subject to the same ceiling.

We calculated the social security tax paid by employees and employers for all A&D NAICS codes and for all fifty states. The sum of total social security taxes paid by employees and employers equals the total social security taxes paid by the industry in the U.S.

Estimating FUTA taxes

Under the Federal Unemployment Tax Act employers are required to remit unemployment taxes equal to 6.2% on the first \$7,000 of wages paid during a calendar year to a covered employee.⁴⁷ However, if a state has adopted an Unemployment Insurance (UI) program that meets federal guidelines, employers in the state can credit state UI taxes against up to 90% of their federal UI tax, on a dollar-for-dollar basis. Thus, when a state UI program meets all federal requirements, employers in the state pay a federal tax rate of 0.6% plus state UI taxes.⁴⁸

We assumed that our aerospace and defense employment base earned at least \$7,000 in our calculations, and estimated FUTA taxes accordingly. We then summed the FUTA tax collections from each NAICS code for each state to estimate the total FUTA taxes collected in a year.

Individual income taxes

Wages earned by U.S. employees working in the aerospace and defense sector are typically subject to federal individual income taxes. Each individual's income tax liability is unique depending on the facts and circumstances of that individual's wage, filing status, number of dependents, other taxable income (e.g., spousal income, capital gains, interest, etc.), contributions to tax deferred or pre-tax accounts (e.g., 401(k), pre-tax health insurance premiums, etc.), deductions, and applicable tax credits. For simplicity purposes, we have assumed that all employees are availing a minimum tax exclusion of \$18,700, calculated after deducting the standard 2010 deduction and personal exemption from gross wages.⁴⁹ In addition, we have assumed a tax bracket of married filing jointly for the aerospace and defense employment base.

In order to calculate federal individual income taxes, we used average annual wages from the BLS on a state-by-state basis. To these wages we applied the relevant tax rates, after factoring in tax exclusions. We calculated federal individual income taxes for all A&D NAICS codes for all fifty states, thereby arriving at a total national figure.

State taxes

States apply varying tax rates on companies and individuals. We considered the following types of taxes for the scope of our study:

- State business income tax
- State individual income tax

Estimating state business income taxes

Companies pay income-based taxes in a state based on the amount of the company's taxable income apportioned to that state. Different states use different methodologies, but typically there are three relevant factors affecting apportionment of income: gross receipts within a state versus overall gross receipts; value of property located within a state versus overall value of property; and payroll within a state versus overall payroll.

In order to estimate state business income taxes, we applied an algorithm to distribute net income to different states.⁵⁰ We obtained net income for each NAICS code by state using a revenue weighting approach and applied the individual state tax rate on these net income figures.

Each state charges different tax rates on business income.⁵¹ Some states have a bracketed tax system with different tax rates for different levels of net income. We used the maximum tax rate applicable in a state for our analysis. The following states do not have state tax rates as such but they charge a tax on businesses under different names:

- Ohio charges a gross receipts tax under the name of 'Commercial Activities Tax' of 0.26% on the revenues generated from the operations of companies;
- Texas charges a gross receipts tax under the name of 'Margin Tax' in the range of 0.5% - 1.0%. We have used a 1.0% tax rate in our analysis; and

- Washington charges a gross receipts tax under the name of 'Business and Occupation Tax' in the range of 0.00138% - of 0.0193%.

The following states levy additional taxes over and above their state business income tax:

- Delaware charges a gross receipts tax under the name of 'Manufacturers' and Merchants' License Tax' in the range of 0.1037% - 2.0736%;
- Michigan charges a gross receipts tax of 0.8% on the revenues and a surcharge of 21.99% on both the business income tax and the gross receipts taxes paid;
- New Hampshire charges a gross receipts tax under the name of 'Business Enterprise Tax' at 0.75%; and
- Virginia charges a gross receipts tax under the name of 'Business/Professional/Occupational License Tax' (BPOL) in the range of 0.03% - 0.58%.

All of the business income taxes are applied on the net income generated by industries categorized under different NAICS codes in each respective state. Gross receipts taxes are applied on revenues generated from those industries in the states. The surtax for Michigan is applied to the total of the business income tax and the gross receipts tax collections from that state. This analysis provides us with the total state business income and similar taxes paid by companies in the A&D industry.

Estimation of state individual income taxes

Employees are subject to state income taxes within the states they perform services as well as where they reside, if different, and are subject to certain exemptions, exclusions, and available credits. There are several types of tax exemptions available to employees which are not included in the scope of our current A&D industry.

We calculated state individual income taxes using an effective tax rate per state, as well as aerospace and defense employment and annual average wages per NAICS code per state. The sum total of the individual income tax collections from all states and NAICS codes gave the total state individual income taxes collected.

Definitions

We used the Regional Input-Output modeling System (RIMS II) multiplier data provided by the Bureau of Economic Analysis for conducting the impact assessment. We used Type II Direct Effect employment multipliers in order to quantify the direct, indirect and induced impact of aerospace and defense employment in the U.S.

Direct economic impacts

Direct impacts measure total expenditures on goods and services, including wages and salaries, used in the production of goods and services within the aerospace and defense industry.

Indirect economic impacts

Indirect impacts refer to the purchase of goods and services by suppliers to the aerospace and defense industry which are then used in the production of goods and services within the aerospace and defense industry. Indirect impacts therefore measure the magnitude of interactions with other businesses which supply the necessary materials and services, and lead to indirect demand for goods and services from other industries.

Induced economic impacts

Induced impacts refer to the impact of personal expenditures by people who have been paid wages and salaries for the production of aerospace and defense goods and services (both direct and indirect employees). The employment multiplier of 2.36 referred to in the study is a "direct effect" multiplier, which accounts for primary and secondary effect employment associated with the aerospace and defense industry. It does not contemplate "final demand," or employment associated with tertiary effect employment well beyond the direct effect of this industry's employment base.

Anomalies in the multiplier data

BEA does not provide multiplier information for Puerto Rico and we were therefore unable to estimate the total impacts in Puerto Rico. Employment in District of Columbia, Hawaii and Puerto Rico was not available at a code by code level for the traditional aerospace industry (NAICS codes 334511 and all the sub-codes of 33641). Hence, the indirect and induced impact in these states due to the above mentioned codes is zero.

We did not have multiplier data for each of the services related NAICS codes. To estimate a value of multiplier for each of the states for service- related codes, we first calculated the total impacts in each state due to each of the manufacturing related NAICS codes. An average value of multiplier for each state was obtained by dividing the total employment in manufacturing related NAICS codes with the direct employment in the manufacturing related NAICS codes. This resulted in an average value of multiplier per state. This average value of multiplier was used to arrive at the total impacts due to services related NAICS codes.

Methodology reconciliation

We conducted research focusing on state government and associated agency sources to identify specific states which advertised or published a state-wide aerospace and defense industry employment number. Our objective was to identify the aerospace and defense industry employment and calculation methodologies available in the public domain for the top states, and compare and contrast these with the employment figures estimated through our BLS approach.

We found that the definition of aerospace and defense varies widely among states, often causing conflicting citations. While most states which publish aerospace and defense employment figures source BLS data, many are inconsistent in their selection of NAICS codes. Furthermore, a few states quote total employment, including indirect and induced jobs.

Figure 38 reconciles the various citations found among the top aerospace and defense states. However, only a handful states we researched actively published industry specific employment numbers; we were not able to find additional resources or data to support our estimates for the remaining six states.

Figure 38: Reconciliation of BLS method with state citations

States	BLS approach	State citation	Gap	Reconciliation
California	162,162	121,400	40,762	Definition of A&D employment uses two NAICS codes (33641, 334511) and 2006 BLS statistics.
Washington	93,925	83,700	10,225	Definition of A&D employment (NAICS code 33641 only) with state estimating employment level based off of 2010 BLS statistics.
Texas	87,781	200,000	(112,219)	Definition of A&D employment uses BLS data and features broad range of NAICS codes (481, 4881, 336411, 336412, 336413, 334511) as well as an approximation of employees categorized under general NAICS codes to define A&D industry. Included in definition are air transportation employees working for airlines as well as airline support employees.
Florida	49,383	83,818	(34,435)	Definition of A&D employment based off BLS statistics uses Aerospace-related NAICS codes 336, 334511, 517410, 927110 and Aviation codes (NAICS codes 481, 481111, 481112, 481211, 481212, 481219, 4881, 488111, 488119, 488190, 611512), which include airlines and airline support.
Arizona	42,687	39,389	3,298	A&D employment in state is based off of 2009 A&D company survey. 19 companies responded to survey, which represents 90% of employment in industry based on study estimates.
Connecticut	41,076	48,004	(6,928)	Definition of A&D employment uses NAICS codes 32592, 33299, 334511, 3364, 3366, 336992, 5417) and is a Connecticut Department of Labor (March 2011) estimate based off of BLS statistics.
Virginia	36,941	26,600	10,341	Definition of A&D employment uses 53 six-digit NAICS codes based off of BLS statistics as well as numbers from specific companies which may fall outside A&D-based NAICS codes.
Kansas	36,859	35,800	1,059	Definition of A&D industry uses NAICS code 33641 and is based off of 2005 BLS statistics.

States	BLS approach	State citation	Gap	Reconciliation
Massachusetts	30,171	47,738	(17,567)	Defense industry impact study conducted by AIM (Associated Industries of Mass.) and University of Massachusetts. Study uses Spending USA federal awards/contracts database for state and not BLS statistics. From this information it used IMPLAN methodology/statistical tool to determine direct, indirect, and total employment for defense industry.
Georgia	29,445	83,952	(54,507)	Definition of A&D employment uses NAICS codes 33641, 481, 4812, 4811, 4881, which includes air transportation and civilian air force. NAICS 33641 comprises 20,181 employees, while air transport services and air force comprise remaining of 83,952.
Ohio	28,157	15,200	12,957	Defines A&D employment levels in state using BLS statistics for one NAICS code (33641).
Maryland	26,380	91,000	(64,620)	State definition of A&D employment is based off of BLS statistics and uses NAIC codes 332992, 332993, 332994, 334511, 3364, 336611, 336992, 488111, 488119, 488190, 517410, 541511, 541712, 611512923140, 927, 928, which includes computer programming services, national security, and R&D.
Missouri	20,510	14,659	5,851	Defines A&D employment levels in state using BLS statistics for one NAICS code (33641).
Colorado	18,378	24,740	(6,362)	Definition of A&D employment uses 44 six-digit NAICS codes based off of BLS statistics as well as numbers from specific companies which may fall outside A&D-based NAICS codes.

Description, sources and additional information

California

State aerospace and defense employment statistics can be found in the 2008 “Aerospace States Incentives to Attract the Industry” report published by the California Economic Development Department. The gap between the state published number (121,400) and the BLS approach calculation (162,162) can be explained by two factors. First, the report uses 2006 Bureau of Labor Statistics and Economic Development statistics to define aerospace and defense employment levels, which is dated, compared to 2010 statistics in the BLS approach. Second, the report’s definition of aerospace and defense industry is comprised of two NAICS codes covering the aerospace and products manufacturing and search, detection, navigation and guidance systems manufacturing (BLS NAICS code 33641 and 334511 respectively), which is narrow as compared to the BLS approach.

Washington

State aerospace and defense employment statistics are found on the Washington State Department of Commerce website. The number is taken from the latest version of the Washington Labor Quarterly Review (January-March 2011). The total employment number is 83,700, which is smaller than the BLS approach number of 93,925. The gap is due to the state using one NAICS code to define aerospace and defense – BLS NAICS code 33641 (aerospace products and parts manufacturing) as compared to the BLS approach definition.

Texas

Employment numbers are located in the “Texas Aerospace and Aviation Industry” report published in 2010. The total employment estimate for the state was 200,000, which is considerably larger than the BLS approach number of 87,781. The gap can be explained by the state’s broad industry definition. This definition includes air transportation services in its overall number. 88,000 employees are categorized under transportation (airlines, NAICS 481) and transportation support (NAICS 4881). An additional 27,000 employees are estimated into the state’s number from other general NAICS codes.

Florida

The state published its aerospace and defense employment number in the “Florida Aviation/Aerospace Cluster Statistical Profile,” using 2010 BLS data. The gap between the state’s published employment number and that of the BLS approach can be explained by inclusions in the state industry definition. Florida’s Aerospace subtotal featuring NAICS codes 336 (transportation equipment manufacturing), 334511 (search, detection, navigation and guidance systems manufacturing), 517410 (satellite telecommunications) and 927110 (space research and technology – including NASA) was 31,265, while its Aviation component which includes airlines and airline support accounted for 52,553 of the 83,818 number.

Arizona

The state identifies an aerospace and defense employment number as a part of a 2010 study entitled, “The economic impact of Aerospace and Defense Firms on the State of Arizona.” The study uses company survey data to calculate total aerospace and defense employment numbers as opposed to BLS statistics, which explains the overall gap in numbers.

Connecticut

The aerospace and defense employment number of 48,004 is estimated in the "Connecticut Economic Digest" September 2011 issue using BLS statistics. The article uses NAICS codes 32592 (explosives manufacturing), 33299 (all other fabricated metal product manufacturing), 334511 (search, detection, navigation and guidance systems manufacturing), 3364 (aerospace products and parts manufacturing), 3366 (ship and boat building), 336992 (military land vehicles) and 5417 (scientific research and development services), which differ from our scope in this study, explaining the gap in employment numbers.

Kansas

The aerospace and defense employment number is calculated based off of 2005 BLS data in the "Kansas Aerospace Industry Forecast" report published in 2006. The report uses NAICS code 3364 (aerospace products and parts manufacturing) in its industry definition. The narrow industry definition and the time period used explain the gap between the BLS approach and the state-defined employment number.

Virginia

State aerospace and defense employment statistics are found on the Virginia Economic Development Partnership website. The state-defined employment number uses BLS statistics, but is calculated by the state using 53 NAICS codes as well as company employment data for companies categorized under different NAICS codes. The overall difference in industry definition between state and BLS approach explains the 10,341 person gap.

Massachusetts

The state aerospace and defense employment number was calculated in the study, "The Defense Industry in Massachusetts" published in 2010. The report is a direct industry impact study only and does not use BLS data in its employment calculation. Instead, it uses USA federal awards/contracts spending to define direct and indirect employment as it calculates the overall impact of the industry on the state.

Georgia

Aerospace and defense industry employment for the state can be found in its "Georgia Aerospace Industry Overview" brochure published in 2010. The state uses BLS data, but defines the industry more broadly as compared to the BLS approach, which explains the large gap in employment statistics. For instance, NAICS code 33641 (aerospace products and parts manufacturing) comprises 20,181 of its 83,952 total aerospace and defense employment number, with the remaining employees coming from air transport services and civilian air force.

Ohio

Ohio aerospace and defense employment statistics are located in its "Ohio's Aerospace and Defense Industries" profile. The number is calculated using 2010 BLS data and includes one NAICS code in its definition of the industry (NAICS 33641 – aerospace products and parts manufacturing). The narrow industry definition as compared to the BLS approach definition explains the gap in total state employment numbers.

Maryland

State aerospace and defense employment statistics are found on the Department of Business and Economic Development website. The state employment number is based on BLS statistics and uses a broader set of NAICS codes in its industry definition as compared to the BLS approach. The state includes NAICS codes in its definition for computer programming, national security, and Research and Development. This difference explains the gap between the state's employment number and the BLS approach.

Missouri

Missouri aerospace and defense employment statistics can be found in the 2011 report entitled, "Missouri Targets Advanced Manufacturing." The number is calculated using 2010 BLS data and includes one NAICS code in its definition of the industry (NAICS 33641 – aerospace products and parts manufacturing). The narrow industry definition as compared to the BLS approach definition explains the gap in total state employment numbers.

Colorado

The state aerospace and defense employment number is located on the "Aerospace Colorado Industry Cluster Profile." The state uses a highly nuanced industry definition which includes 44 six-digit NAICS codes to define the aerospace and defense industry. The difference in industry definition between the state number and the BLS approach is the reason for the gap in numbers.

Detailed tables and charts

Figure 39: Employment by state¹

States	2005	2006	2007	2008	2009	2010
California	168,222	170,061	169,605	171,468	165,477	162,162
Washington	77,899	85,634	92,761	96,001	95,791	93,925
Texas	82,956	86,595	87,752	90,322	88,226	87,781
Florida	49,102	50,848	52,559	53,165	50,696	49,383
Arizona	41,233	42,061	42,441	43,276	45,417	42,687
Connecticut	40,439	41,389	42,551	43,642	42,205	41,076
Virginia	35,457	35,492	35,569	35,977	36,486	36,941
Kansas	39,815	41,821	45,062	47,385	41,394	36,859
New York	33,381	34,140	35,078	36,061	35,538	34,391
Pennsylvania	25,932	27,418	28,056	30,549	31,017	31,220
Massachusetts	27,479	28,452	28,775	29,875	29,789	30,171
Georgia	26,674	27,349	28,130	29,062	29,191	29,445
Ohio	25,910	27,306	28,469	30,023	29,292	28,157
Maryland	24,969	25,160	25,259	25,859	26,331	26,380
Alabama	19,208	20,325	22,218	23,563	23,933	23,090
New Jersey	21,138	21,830	22,132	22,291	21,373	20,701
Missouri	20,116	20,313	20,151	20,656	20,902	20,510
Colorado	19,419	19,541	19,873	19,459	19,085	18,378
Louisiana	16,181	17,078	18,539	19,284	18,918	17,145
Indiana	15,181	15,570	16,405	17,365	17,502	16,570
Illinois	16,262	16,997	17,361	17,680	16,583	16,284
Michigan	16,417	16,534	16,566	16,574	14,976	15,018
Mississippi	12,378	12,298	12,713	13,617	13,287	13,056
Iowa	13,107	13,234	13,211	13,182	12,991	12,869
North Carolina	11,050	11,942	13,044	12,846	12,308	12,140
Utah	12,130	12,884	13,304	13,707	13,048	11,489
Minnesota	10,698	10,950	11,461	11,902	11,703	11,305
Maine	8,106	8,344	8,792	9,195	8,873	8,536
Oklahoma	6,902	7,893	8,720	9,263	8,444	8,451
Tennessee	9,382	9,499	8,895	8,654	8,416	8,401
New Mexico	7,142	8,493	9,420	9,804	8,289	8,108
South Carolina	3,983	5,232	5,907	6,414	6,681	7,894
Kentucky	5,247	5,639	6,323	6,830	7,201	7,131
Wisconsin	7,441	7,704	8,133	8,059	7,422	7,002
New Hampshire	7,163	7,298	7,297	7,348	7,136	6,982
Oregon	5,658	6,322	6,623	7,136	6,419	6,523
Arkansas	6,311	6,272	6,451	7,190	6,968	6,358
District of Columbia	5,849	6,065	5,829	5,758	5,534	5,451
Puerto Rico	4,382	4,641	4,733	4,673	4,540	4,370
West Virginia	3,559	3,724	3,779	3,608	3,792	3,729
Rhode Island	3,309	3,395	3,467	3,543	3,459	3,381
Nevada	3,450	3,578	3,713	3,687	3,219	3,110
Vermont	2,837	2,983	3,133	3,043	2,981	2,852
Hawaii	2,443	2,553	2,640	2,636	2,597	2,580
Idaho	1,978	2,183	1,998	2,401	2,344	2,312
Nebraska	1,816	1,947	2,025	2,107	2,098	2,001
Alaska	1,441	1,450	1,499	1,581	1,644	1,516
Delaware	1,438	1,447	1,455	1,482	1,391	1,381
Montana	973	1,047	1,142	1,160	1,121	1,147
North Dakota	1,220	1,275	1,338	1,270	1,278	1,124
South Dakota	625	693	733	796	811	758
Wyoming	356	378	408	413	399	386
Total	1,005,759	1,043,277	1,073,499	1,102,841	1,076,516	1,050,618

Figure 40: Average wages by state⁸

States	2005	2006	2007	2008	2009	2010
Massachusetts	\$84,404	\$89,647	\$94,784	\$96,455	\$96,449	\$99,096
Colorado	\$82,350	\$84,971	\$87,149	\$90,357	\$92,129	\$95,295
District of Columbia	\$96,689	\$92,231	\$88,071	\$89,950	\$91,975	\$95,086
California	\$81,089	\$87,103	\$88,254	\$89,534	\$92,329	\$94,354
New Hampshire	\$79,076	\$85,142	\$86,450	\$90,425	\$93,096	\$93,596
New Jersey	\$80,860	\$85,154	\$87,637	\$89,030	\$91,496	\$93,120
Maryland	\$79,305	\$81,806	\$85,185	\$86,103	\$89,547	\$90,975
Washington	\$81,396	\$87,016	\$84,555	\$85,073	\$85,948	\$89,233
Connecticut	\$71,801	\$76,770	\$80,705	\$81,467	\$82,327	\$85,682
Missouri	\$77,421	\$84,754	\$80,774	\$82,617	\$81,858	\$85,332
Arizona	\$73,984	\$77,236	\$80,279	\$82,169	\$83,269	\$83,673
Delaware	\$96,820	\$93,488	\$81,144	\$82,357	\$83,317	\$83,429
Texas	\$68,780	\$72,541	\$75,216	\$77,484	\$80,033	\$81,624
Illinois	\$74,066	\$74,544	\$75,996	\$76,606	\$78,156	\$78,558
Iowa	\$74,214	\$76,160	\$78,028	\$74,799	\$76,714	\$78,438
New York	\$71,941	\$70,841	\$73,997	\$74,125	\$76,435	\$77,599
Pennsylvania	\$71,395	\$73,078	\$73,635	\$74,894	\$75,934	\$77,230
Utah	\$61,234	\$63,354	\$68,223	\$69,637	\$73,284	\$77,026
Minnesota	\$66,409	\$69,265	\$74,176	\$73,823	\$76,161	\$75,759
Virginia	\$62,793	\$65,911	\$68,696	\$72,173	\$73,031	\$75,661
Ohio	\$67,594	\$70,490	\$72,260	\$71,041	\$73,544	\$73,251
Georgia	\$62,152	\$65,203	\$67,985	\$69,463	\$70,841	\$73,234
Michigan	\$68,067	\$70,077	\$71,850	\$73,715	\$71,660	\$72,325
Oregon	\$58,612	\$60,481	\$64,921	\$68,499	\$69,438	\$71,800
New Mexico	\$63,829	\$67,833	\$68,753	\$67,543	\$69,764	\$71,164
Vermont	\$64,837	\$66,769	\$68,684	\$68,729	\$72,049	\$71,082
North Carolina	\$59,874	\$62,802	\$64,484	\$68,320	\$70,019	\$70,040
Kansas	\$61,163	\$68,914	\$67,781	\$64,492	\$66,169	\$69,402
Florida	\$59,171	\$62,259	\$63,809	\$65,644	\$67,297	\$68,784
Alabama	\$57,260	\$60,901	\$60,756	\$64,031	\$65,551	\$68,435
Tennessee	\$54,282	\$56,898	\$60,687	\$63,227	\$65,280	\$65,354
Hawaii	\$56,612	\$58,960	\$62,419	\$62,342	\$64,327	\$65,061
Maine	\$53,720	\$56,558	\$60,136	\$61,326	\$61,724	\$64,465
South Carolina	\$51,190	\$47,803	\$51,419	\$54,668	\$57,778	\$63,290
Rhode Island	\$55,491	\$57,317	\$58,431	\$60,655	\$61,863	\$63,247
Louisiana	\$46,746	\$49,806	\$51,716	\$53,739	\$59,605	\$62,815
Nevada	\$58,839	\$60,618	\$60,848	\$61,624	\$60,856	\$61,991
Idaho	\$56,194	\$60,790	\$58,691	\$60,455	\$60,441	\$61,785
Alaska	\$46,057	\$50,114	\$54,240	\$56,929	\$58,658	\$61,253
North Dakota	\$42,675	\$45,962	\$46,564	\$51,449	\$52,862	\$59,939
West Virginia	\$48,098	\$50,284	\$53,173	\$54,951	\$56,711	\$58,149
Mississippi	\$45,208	\$46,354	\$51,149	\$54,310	\$55,709	\$56,777
Indiana	\$56,848	\$60,026	\$58,757	\$57,113	\$54,473	\$56,646
Wisconsin	\$50,952	\$52,476	\$52,118	\$55,630	\$55,682	\$56,498
Oklahoma	\$48,604	\$54,092	\$54,420	\$53,015	\$55,878	\$56,489
Kentucky	\$46,058	\$47,612	\$51,236	\$51,572	\$54,092	\$54,593
Wyoming	\$38,373	\$42,775	\$47,780	\$49,113	\$49,620	\$51,805
Arkansas	\$43,895	\$46,399	\$50,116	\$51,559	\$52,270	\$51,565
Nebraska	\$44,532	\$45,982	\$47,136	\$48,496	\$49,165	\$48,442
Montana	\$41,615	\$41,891	\$44,613	\$44,428	\$44,728	\$47,466
South Dakota	\$42,280	\$43,075	\$44,125	\$44,963	\$47,534	\$47,246
Puerto Rico	\$19,340	\$20,242	\$21,277	\$21,912	\$22,751	\$22,396

Figure 41: Revenues by state¹

States	2005	2006	2007	2008	2009	2010
California	\$41,820,416,904	\$43,029,519,442	\$50,882,685,658	\$53,152,390,221	\$51,103,770,166	\$52,254,892,780
Washington	\$20,741,103,863	\$23,325,963,879	\$30,061,905,265	\$31,899,616,623	\$31,933,464,531	\$32,781,367,636
Texas	\$20,134,750,248	\$21,472,586,337	\$24,857,061,950	\$26,388,345,647	\$25,981,263,999	\$27,041,844,407
Arizona	\$11,066,986,262	\$11,458,246,274	\$13,789,870,391	\$14,560,404,410	\$15,312,314,144	\$14,990,985,510
Florida	\$11,322,729,141	\$12,080,064,625	\$14,381,204,446	\$15,075,342,451	\$14,359,388,115	\$14,682,550,330
Connecticut	\$10,279,660,883	\$10,717,512,009	\$12,938,927,099	\$13,706,515,281	\$13,340,716,833	\$13,718,428,181
Kansas	\$11,072,588,802	\$11,828,638,210	\$15,129,418,806	\$16,297,748,764	\$14,196,542,942	\$13,229,657,291
Pennsylvania	\$5,357,636,241	\$5,905,811,865	\$7,790,354,698	\$9,467,931,310	\$9,463,141,660	\$10,037,424,108
Georgia	\$6,662,134,716	\$6,970,845,729	\$8,569,988,010	\$9,240,947,711	\$9,238,429,842	\$9,750,839,887
Ohio	\$6,072,528,902	\$6,572,365,024	\$8,684,414,427	\$9,831,002,143	\$9,477,612,907	\$9,597,179,399
New York	\$7,313,369,577	\$7,719,436,475	\$9,203,230,444	\$9,719,938,971	\$9,514,804,697	\$9,411,818,253
Massachusetts	\$6,233,416,185	\$6,607,529,557	\$7,819,712,500	\$8,377,150,076	\$8,363,726,881	\$8,685,721,853
Virginia	\$6,179,824,957	\$6,379,638,438	\$7,014,507,147	\$7,646,994,971	\$7,857,809,417	\$8,267,107,488
Alabama	\$4,638,897,944	\$5,009,264,914	\$6,716,801,334	\$7,562,732,834	\$7,660,368,014	\$7,816,573,270
Maryland	\$5,728,837,075	\$5,895,824,766	\$6,865,507,171	\$7,222,057,092	\$7,335,486,949	\$7,651,375,691
Indiana	\$3,732,160,963	\$3,910,451,771	\$5,781,433,172	\$6,804,295,275	\$6,606,857,924	\$6,664,806,347
Missouri	\$5,075,647,003	\$5,191,597,678	\$5,979,042,068	\$6,261,142,520	\$6,374,602,798	\$6,572,162,153
Louisiana	\$2,972,953,198	\$3,240,593,390	\$4,974,487,245	\$6,156,643,757	\$5,956,240,928	\$5,854,915,818
New Jersey	\$4,515,003,552	\$4,777,212,650	\$5,522,117,731	\$5,714,643,693	\$5,401,499,667	\$5,437,063,516
Colorado	\$4,460,322,263	\$4,557,213,132	\$5,297,939,652	\$5,267,747,695	\$5,159,730,961	\$5,224,228,552
Iowa	\$3,409,274,640	\$3,547,901,145	\$4,150,883,778	\$4,240,473,404	\$4,189,938,992	\$4,312,717,316
Michigan	\$3,206,531,703	\$3,340,457,811	\$3,934,244,935	\$4,262,935,946	\$3,777,386,990	\$3,882,674,943
Illinois	\$3,046,422,136	\$3,314,201,855	\$3,835,788,100	\$4,070,429,414	\$3,793,496,825	\$3,874,947,506
Utah	\$3,201,545,022	\$3,482,009,827	\$4,187,294,263	\$4,416,160,524	\$4,184,795,298	\$3,816,983,604
Mississippi	\$2,042,221,106	\$2,081,300,908	\$2,371,316,171	\$2,833,778,379	\$2,880,759,434	\$3,005,550,685
Minnesota	\$2,303,495,318	\$2,576,702,784	\$2,870,242,185	\$3,052,022,417	\$2,917,216,332	\$2,957,046,378
North Carolina	\$2,152,256,144	\$2,444,926,743	\$3,106,733,335	\$3,074,639,507	\$2,870,637,966	\$2,877,556,877
Oklahoma	\$1,612,414,562	\$1,931,251,338	\$2,511,258,289	\$2,742,413,209	\$2,476,043,953	\$2,628,058,417
New Hampshire	\$1,905,528,079	\$1,973,105,782	\$2,341,677,094	\$2,403,786,762	\$2,328,100,013	\$2,386,096,779
South Carolina	\$666,701,856	\$922,063,292	\$1,211,897,424	\$1,474,959,384	\$1,575,767,059	\$2,008,847,359
Kentucky	\$1,143,913,571	\$1,300,981,145	\$1,640,156,251	\$1,831,589,187	\$1,938,594,805	\$2,003,769,247
Maine	\$1,349,069,888	\$1,428,514,999	\$1,662,915,654	\$1,932,188,478	\$1,933,047,351	\$1,987,605,031
Arkansas	\$1,396,467,530	\$1,497,392,708	\$1,777,610,496	\$2,096,156,656	\$2,051,355,091	\$1,900,381,975
New Mexico	\$1,407,381,756	\$1,712,436,423	\$2,186,299,095	\$2,406,904,782	\$1,902,392,712	\$1,892,663,563
Oregon	\$1,272,250,772	\$1,471,714,235	\$1,769,971,840	\$1,971,142,917	\$1,746,687,036	\$1,890,149,302
Tennessee	\$1,704,048,967	\$1,806,716,681	\$1,823,962,869	\$1,807,977,399	\$1,758,388,283	\$1,776,798,797
Wisconsin	\$1,455,688,574	\$1,551,235,371	\$1,837,741,234	\$1,841,698,365	\$1,675,135,887	\$1,630,924,328
District of Columbia	\$1,181,759,003	\$1,267,402,484	\$1,454,912,865	\$1,497,246,250	\$1,462,110,650	\$1,500,765,618
Puerto Rico	\$1,001,345,655	\$1,061,175,126	\$1,248,434,255	\$1,264,808,504	\$1,232,997,731	\$1,267,717,941
West Virginia	\$891,847,955	\$956,209,214	\$1,142,618,487	\$1,099,830,432	\$1,165,620,935	\$1,182,344,248
Vermont	\$711,650,801	\$807,811,143	\$1,022,759,647	\$1,057,012,746	\$981,088,689	\$1,007,737,001
Rhode Island	\$635,952,249	\$667,292,225	\$767,078,723	\$837,946,113	\$832,442,683	\$857,555,932
Nevada	\$581,381,488	\$629,425,659	\$741,156,632	\$778,027,034	\$669,149,772	\$697,821,633
Hawaii	\$441,604,513	\$479,900,204	\$552,017,647	\$579,330,396	\$576,005,320	\$590,462,674
Nebraska	\$348,042,198	\$403,179,880	\$445,703,279	\$482,951,045	\$465,488,098	\$481,000,846
Idaho	\$300,273,606	\$346,808,240	\$363,618,064	\$461,978,061	\$459,311,979	\$442,060,517
Alaska	\$219,477,067	\$249,520,004	\$281,018,303	\$317,869,952	\$330,633,120	\$338,593,064
North Dakota	\$279,230,658	\$299,577,625	\$361,088,946	\$361,962,711	\$360,075,331	\$336,120,841
Delaware	\$263,793,086	\$269,295,303	\$261,046,538	\$280,777,714	\$260,798,944	\$265,541,938
Montana	\$169,278,872	\$191,730,023	\$228,907,538	\$243,568,135	\$238,172,119	\$246,884,793
South Dakota	\$128,181,392	\$162,509,058	\$168,001,206	\$184,704,906	\$178,944,897	\$172,296,457
Wyoming	\$65,524,150	\$71,917,140	\$84,444,433	\$87,725,278	\$81,259,456	\$81,699,768
Total	\$235,875,522,997	\$250,896,982,542	\$304,603,408,787	\$326,348,587,454	\$317,931,617,123	\$323,972,317,849

Figure 42: State business income and gross receipts taxes¹²

States	2005	2006	2007	2008	2009	2010
California	\$201,811,821	\$257,211,191	\$365,519,550	\$316,300,757	\$304,076,140	\$311,455,188
Texas	\$201,347,502	\$214,725,863	\$248,570,620	\$263,883,456	\$259,812,640	\$270,418,444
Virginia	\$53,873,135	\$59,978,446	\$67,265,241	\$72,006,842	\$74,393,490	\$78,714,488
Connecticut	\$44,910,764	\$57,909,212	\$84,964,984	\$74,206,788	\$72,286,231	\$74,340,872
Arizona	\$43,233,711	\$55,052,295	\$81,651,205	\$69,241,788	\$73,041,742	\$71,386,817
Kansas	\$44,782,245	\$59,444,585	\$94,011,895	\$82,167,604	\$71,370,499	\$66,455,163
Pennsylvania	\$30,497,694	\$39,900,653	\$57,501,198	\$55,436,882	\$55,945,281	\$59,814,902
Florida	\$30,956,128	\$40,877,248	\$58,399,262	\$52,261,974	\$49,809,696	\$50,903,585
Michigan	\$39,145,459	\$42,557,389	\$52,552,187	\$54,702,427	\$48,637,230	\$50,012,345
Massachusetts	\$28,225,212	\$36,370,527	\$52,206,274	\$46,496,021	\$46,493,821	\$48,399,691
New York	\$26,160,782	\$34,299,480	\$48,458,584	\$44,372,128	\$43,188,931	\$42,482,838
Maryland	\$23,318,805	\$29,771,156	\$41,576,856	\$37,602,997	\$38,137,703	\$39,903,349
Georgia	\$20,940,618	\$27,280,325	\$40,606,352	\$35,801,635	\$35,852,934	\$38,020,877
Iowa	\$24,758,259	\$30,567,033	\$43,555,875	\$35,966,477	\$35,456,869	\$36,502,600
Indiana	\$18,910,995	\$26,023,900	\$41,160,661	\$37,737,370	\$36,293,572	\$36,455,924
Alabama	\$16,424,573	\$22,140,463	\$35,292,770	\$31,858,741	\$32,380,495	\$33,003,307
New Hampshire	\$23,323,869	\$26,409,946	\$34,565,476	\$32,386,345	\$31,303,217	\$32,050,643
Louisiana	\$15,178,412	\$21,033,776	\$32,383,800	\$31,282,820	\$30,386,634	\$29,647,952
New Jersey	\$19,297,969	\$25,134,257	\$33,809,766	\$30,627,547	\$28,478,032	\$28,580,734
Missouri	\$17,189,177	\$21,478,866	\$30,439,912	\$25,800,835	\$26,342,061	\$27,187,443
Ohio	\$16,622,270	\$18,216,381	\$24,358,618	\$27,150,093	\$26,172,401	\$26,499,479
Minnesota	\$16,353,808	\$18,231,388	\$21,746,998	\$19,295,010	\$18,464,594	\$18,788,602
Illinois	\$9,830,239	\$13,276,911	\$16,874,005	\$16,822,459	\$15,760,254	\$15,976,814
Maine	\$7,675,261	\$10,224,793	\$12,229,183	\$13,546,127	\$13,637,548	\$14,036,259
Colorado	\$9,819,519	\$12,065,534	\$17,185,603	\$13,848,300	\$13,623,165	\$13,770,401
Utah	\$8,777,383	\$12,112,288	\$17,425,312	\$15,047,542	\$14,222,915	\$12,878,278
Mississippi	\$6,474,862	\$8,138,487	\$9,385,526	\$10,739,605	\$10,957,206	\$11,437,423
North Carolina	\$6,486,055	\$9,395,443	\$13,192,242	\$12,077,619	\$10,936,597	\$10,755,876
Oklahoma	\$4,753,271	\$7,066,797	\$11,523,883	\$10,259,185	\$9,126,064	\$9,739,882
Oregon	\$4,946,639	\$7,112,334	\$10,452,330	\$9,836,825	\$8,684,230	\$9,447,648
District of Columbia	\$5,580,933	\$7,076,078	\$10,066,081	\$8,583,843	\$8,441,592	\$8,680,028
Arkansas	\$6,492,718	\$7,190,962	\$9,952,235	\$9,478,744	\$9,327,651	\$8,634,602
Kentucky	\$3,896,581	\$4,979,174	\$7,476,396	\$6,844,510	\$7,243,234	\$7,496,184
New Mexico	\$4,734,305	\$6,770,974	\$10,659,898	\$10,194,836	\$7,567,576	\$7,460,545
Wisconsin	\$5,912,988	\$7,231,039	\$9,876,233	\$8,286,034	\$7,552,037	\$7,253,051
West Virginia	\$4,011,521	\$5,304,538	\$7,966,371	\$6,110,441	\$6,555,658	\$6,647,045
Delaware	\$6,210,676	\$6,443,166	\$6,398,564	\$6,859,384	\$6,409,229	\$6,525,276
Washington	\$4,003,033	\$4,501,911	\$5,801,948	\$6,156,626	\$6,163,159	\$6,326,804
Vermont	\$4,826,809	\$5,700,469	\$7,817,020	\$6,078,367	\$5,637,915	\$5,789,508
Tennessee	\$5,816,461	\$6,532,807	\$7,111,663	\$5,781,104	\$5,614,801	\$5,649,492
Rhode Island	\$3,288,652	\$4,340,999	\$5,476,492	\$5,486,417	\$5,449,703	\$5,620,209
South Carolina	\$1,141,868	\$1,789,625	\$2,833,120	\$3,336,774	\$3,898,214	\$5,431,736
Nebraska	\$1,510,535	\$1,873,228	\$2,077,768	\$2,102,482	\$1,985,316	\$2,059,080
Hawaii	\$1,206,342	\$1,533,125	\$2,062,025	\$1,890,456	\$1,887,434	\$1,940,386
Idaho	\$774,133	\$959,023	\$1,154,041	\$1,469,263	\$1,566,204	\$1,453,892
North Dakota	\$851,529	\$1,094,843	\$1,629,352	\$1,383,331	\$1,364,735	\$1,248,862
Alaska	\$519,215	\$638,534	\$802,438	\$868,065	\$929,998	\$961,445
Montana	\$331,986	\$445,395	\$593,016	\$565,410	\$574,007	\$605,215
Nevada	\$0	\$0	\$0	\$0	\$0	\$0
Puerto Rico	\$0	\$0	\$0	\$0	\$0	\$0
South Dakota	\$0	\$0	\$0	\$0	\$0	\$0
Wyoming	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$1,077,136,721	\$1,318,412,858	\$1,798,620,830	\$1,670,240,286	\$1,623,440,654	\$1,658,851,188

Figure 43: State individual income tax¹²

States	2005	2006	2007	2008	2009	2010
California	\$450,422,372	\$489,119,935	\$494,252,484	\$506,927,510	\$504,486,679	\$505,224,739
Connecticut	\$103,318,335	\$113,061,198	\$122,194,307	\$126,510,129	\$123,635,184	\$125,232,941
New York	\$112,370,312	\$113,167,571	\$121,459,008	\$125,076,426	\$127,104,705	\$124,876,296
Massachusetts	\$83,799,038	\$92,157,940	\$98,543,067	\$104,113,734	\$103,809,352	\$108,026,465
Maryland	\$75,248,859	\$78,215,144	\$81,767,849	\$84,609,303	\$89,600,292	\$91,200,879
Virginia	\$60,222,057	\$63,273,796	\$66,092,020	\$70,233,262	\$72,073,963	\$75,598,768
Kansas	\$63,928,909	\$75,659,361	\$80,181,824	\$80,224,529	\$71,903,812	\$67,154,405
Ohio	\$56,639,183	\$62,250,255	\$66,529,361	\$68,976,473	\$69,668,511	\$66,703,513
Pennsylvania	\$50,781,770	\$54,958,277	\$56,665,293	\$62,754,578	\$64,601,545	\$66,133,409
Georgia	\$41,515,772	\$44,656,596	\$47,891,942	\$50,552,621	\$51,784,991	\$53,999,625
Arizona	\$44,629,045	\$47,526,239	\$49,844,749	\$52,021,974	\$55,327,389	\$52,253,451
New Jersey	\$45,029,755	\$48,974,187	\$51,099,526	\$52,285,474	\$51,521,474	\$50,786,804
Missouri	\$37,933,966	\$41,933,498	\$39,646,104	\$41,566,602	\$41,676,309	\$42,629,747
Colorado	\$35,498,004	\$36,858,399	\$38,445,013	\$39,028,971	\$39,031,051	\$38,876,560
Alabama	\$21,548,756	\$24,252,012	\$26,448,187	\$29,560,312	\$30,737,389	\$30,960,141
Minnesota	\$23,455,955	\$25,040,508	\$28,066,943	\$29,009,842	\$29,427,186	\$28,277,538
North Carolina	\$21,680,683	\$24,576,761	\$27,563,006	\$28,760,271	\$28,239,730	\$27,862,587
Iowa	\$24,689,423	\$25,582,567	\$26,164,659	\$25,027,154	\$25,296,235	\$25,621,009
Utah	\$20,654,725	\$22,696,783	\$25,238,644	\$26,542,502	\$26,590,094	\$24,606,811
Michigan	\$23,088,162	\$23,939,148	\$24,593,154	\$25,243,043	\$22,173,191	\$22,441,997
Illinois	\$21,067,511	\$22,162,912	\$23,077,615	\$23,691,103	\$22,670,212	\$22,376,276
Indiana	\$20,412,564	\$22,106,239	\$22,799,761	\$23,457,983	\$22,550,164	\$22,200,923
Louisiana	\$14,635,195	\$16,458,049	\$18,550,754	\$20,050,265	\$21,817,750	\$20,837,233
District of Columbia	\$20,512,133	\$20,291,605	\$18,622,044	\$18,786,436	\$18,462,083	\$18,800,098
Maine	\$13,638,804	\$14,780,137	\$16,560,080	\$17,661,062	\$17,153,888	\$17,235,102
Oregon	\$11,396,198	\$13,140,468	\$14,776,552	\$16,798,766	\$15,316,644	\$16,094,353
Mississippi	\$9,645,607	\$9,826,380	\$11,208,432	\$12,747,939	\$12,759,662	\$12,777,718
Kentucky	\$7,779,229	\$8,642,819	\$10,428,920	\$11,339,238	\$12,539,000	\$12,532,241
Wisconsin	\$11,123,231	\$11,861,812	\$12,435,831	\$13,153,840	\$12,125,776	\$11,607,043
New Mexico	\$7,823,090	\$9,885,873	\$11,114,459	\$11,364,073	\$9,923,034	\$9,901,341
Oklahoma	\$6,877,288	\$8,752,153	\$9,727,498	\$10,066,538	\$9,672,957	\$9,786,925
South Carolina	\$3,854,858	\$4,729,051	\$5,743,269	\$6,630,103	\$7,299,142	\$9,446,579
Arkansas	\$6,842,423	\$7,188,257	\$7,985,068	\$9,156,585	\$8,996,791	\$8,098,454
West Virginia	\$4,440,966	\$4,858,771	\$5,213,693	\$5,144,338	\$5,578,856	\$5,625,628
Rhode Island	\$4,385,721	\$4,648,256	\$4,839,122	\$5,133,876	\$5,110,830	\$5,107,929
Vermont	\$4,497,170	\$4,869,806	\$5,261,183	\$5,113,386	\$5,251,758	\$4,956,225
Hawaii	\$3,644,256	\$3,966,330	\$4,342,084	\$4,330,815	\$4,402,701	\$4,423,776
Idaho	\$3,023,134	\$3,608,438	\$3,188,459	\$3,946,290	\$3,852,921	\$3,884,178
Delaware	\$3,984,986	\$3,871,928	\$3,380,376	\$3,493,881	\$3,317,385	\$3,298,749
Nebraska	\$1,947,617	\$2,156,720	\$2,299,375	\$2,461,873	\$2,484,344	\$2,335,070
Montana	\$995,303	\$1,078,221	\$1,252,110	\$1,266,086	\$1,231,842	\$1,338,122
New Hampshire	\$1,076,499	\$1,180,887	\$1,198,894	\$1,262,837	\$1,262,639	\$1,242,048
North Dakota	\$628,356	\$707,387	\$752,092	\$788,686	\$815,580	\$813,111
Tennessee	\$661,993	\$702,591	\$701,712	\$711,287	\$714,153	\$713,673
Alaska	\$0	\$0	\$0	\$0	\$0	\$0
Florida	\$0	\$0	\$0	\$0	\$0	\$0
Nevada	\$0	\$0	\$0	\$0	\$0	\$0
Puerto Rico	\$0	\$0	\$0	\$0	\$0	\$0
South Dakota	\$0	\$0	\$0	\$0	\$0	\$0
Texas	\$0	\$0	\$0	\$0	\$0	\$0
Washington	\$0	\$0	\$0	\$0	\$0	\$0
Wyoming	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$1,581,349,214	\$1,709,375,263	\$1,788,146,524	\$1,857,581,997	\$1,853,999,197	\$1,853,900,479

Figure 44: Direct, indirect and induced employment in the A&D industry by state³²

States	Direct employment in A&D industry	Indirect + Induced employment in A&D industry	Direct + Indirect + Induced employment in A&D industry
California	162,162	479,216	641,378
Texas	87,781	254,156	341,937
Washington	93,925	242,712	336,637
Florida	49,383	118,023	167,406
Arizona	42,687	110,797	153,484
Connecticut	41,076	90,516	131,592
Ohio	28,157	89,434	117,591
Virginia	36,941	76,494	113,434
Massachusetts	30,171	79,385	109,556
Kansas	36,859	68,998	105,857
Pennsylvania	31,220	74,558	105,778
Georgia	29,445	75,872	105,317
New York	34,391	54,113	88,504
Colorado	18,378	63,289	81,667
Maryland	26,380	49,492	75,872
Alabama	23,090	51,049	74,139
New Jersey	20,701	50,096	70,797
Missouri	20,510	43,808	64,318
Illinois	16,284	43,385	59,669
Michigan	15,018	32,238	47,256
North Carolina	12,140	34,335	46,475
Indiana	16,570	27,412	43,982
Utah	11,489	32,077	43,566
Louisiana	17,145	24,590	41,735
Minnesota	11,305	21,192	32,497
Mississippi	13,056	17,414	30,470
Iowa	12,869	15,362	28,231
New Hampshire	6,982	18,531	25,514
Tennessee	8,401	16,486	24,886
Oklahoma	8,451	15,396	23,848
Oregon	6,523	15,141	21,664
New Mexico	8,108	13,476	21,584
South Carolina	7,894	13,529	21,423
Maine	8,536	11,825	20,362
Kentucky	7,131	12,123	19,254
Wisconsin	7,002	11,344	18,346
Arkansas	6,358	9,548	15,906
Rhode Island	3,381	5,508	8,889
West Virginia	3,729	5,011	8,740
Nevada	3,110	5,214	8,324
District of Columbia	5,451	-	5,451
Delaware	1,381	3,103	4,484
Puerto Rico	4,370	-	4,370
Idaho	2,312	1,958	4,269
Vermont	2,852	1,010	3,861
Hawaii	2,580	999	3,579
Nebraska	2,001	567	2,568
Alaska	1,516	872	2,389
North Dakota	1,124	1,015	2,139
Montana	1,147	929	2,076
South Dakota	758	457	1,215
Wyoming	386	133	519
Total	1,050,618	2,484,188	3,534,807

Figure 45: Average A&D wages by classification⁸

States	2005	2006	2007	2008	2009	2010
Search, detection, navigation and guidance systems manufacturing (334511)	\$84,046	\$86,980	\$89,740	\$91,147	\$93,946	\$96,339
Software services (541511)	\$83,693	\$87,986	\$90,868	\$92,508	\$91,997	\$95,972
Designing computer systems (541512)	\$79,922	\$83,615	\$88,036	\$88,018	\$88,772	\$92,401
Radio and television broadcast and wireless communication equipment manufacturing (334220)	\$77,051	\$80,868	\$82,857	\$82,693	\$86,276	\$90,005
Research and experimental development services (541710)	\$85,868	\$89,130	\$89,349	\$89,295	\$89,001	\$89,103
Aerospace products and parts manufacturing (33641)	\$72,879	\$78,073	\$78,766	\$79,684	\$81,570	\$83,985
Computer related services (541519)	\$70,409	\$72,927	\$76,252	\$78,667	\$79,134	\$83,801
Engineering services (541330)	\$68,411	\$72,425	\$76,108	\$79,183	\$81,473	\$83,359
Management consulting services (541618)	\$72,518	\$77,103	\$78,366	\$83,146	\$79,533	\$83,109
Data processing services (518210)	\$64,047	\$67,574	\$73,088	\$73,923	\$76,281	\$79,315
On site computer systems management (541513)	\$68,676	\$71,334	\$75,163	\$72,624	\$73,262	\$75,582
Office administrative services (561110)	\$64,104	\$67,314	\$72,614	\$71,780	\$69,868	\$74,049
Transmission service providers - provides services for transmitting messages in different forms, such as voice, video and text (517110)	\$69,039	\$72,662	\$70,714	\$70,777	\$70,580	\$73,451
Services for planning and designing buildings (541310)	\$63,347	\$67,358	\$70,659	\$72,217	\$69,794	\$70,042
Ammunition manufacturing - except small arms (332993)	\$55,468	\$59,047	\$61,860	\$65,623	\$66,748	\$67,839
Environmental advice and assistance services (541620)	\$56,510	\$58,219	\$61,815	\$63,761	\$64,836	\$66,733
Ordnance and other accessories manufacturing (332995)	\$63,038	\$63,911	\$70,548	\$65,490	\$71,967	\$66,233
Publishers of mailing lists, directories and compilation of other documents (511140)	\$59,418	\$64,135	\$65,377	\$63,905	\$63,264	\$65,873
Military land vehicles manufacturing (336992)	\$57,228	\$49,451	\$50,911	\$49,222	\$57,810	\$58,885
Shipbuilding (336611)	\$46,621	\$49,141	\$52,377	\$54,797	\$55,434	\$57,216
Remediation services (562910)	\$47,917	\$49,533	\$50,815	\$52,891	\$54,056	\$56,283
Small arms manufacturing (332994)	\$41,570	\$44,784	\$50,420	\$48,163	\$52,166	\$52,695
Print or electronic publishing services (511199)	\$43,385	\$45,242	\$46,966	\$47,816	\$49,420	\$51,570
Small arms ammunitions manufacturing (332992)	\$48,097	\$49,462	\$55,563	\$49,187	\$51,289	\$50,935
Providers of operating staff for support services at client sites - such as janitorial and trash disposal services (561210)	\$41,022	\$41,975	\$43,760	\$45,706	\$47,261	\$49,209
Business and organizational support services (561990)	\$35,263	\$37,574	\$38,131	\$37,434	\$36,541	\$37,930
Landscaping services (561730)	\$25,736	\$26,696	\$27,857	\$28,510	\$28,200	\$28,625
Guard and patrol services (561612)	\$20,973	\$21,964	\$22,484	\$23,150	\$23,579	\$23,838
Service providers for cleaning interiors of buildings and transport equipment (561720)	\$16,385	\$17,105	\$17,801	\$18,374	\$18,679	\$19,115

Figure 46: 2010 contribution to state GDP³²

States	Contribution to state GDP
Kansas	10.40%
Washington	9.63%
Arizona	5.91%
Connecticut	5.78%
Alabama	4.53%
New Hampshire	3.96%
Vermont	3.93%
Maine	3.85%
Utah	3.33%
Mississippi	3.08%
Iowa	3.02%
California	2.75%
Missouri	2.69%
Louisiana	2.68%
Maryland	2.59%
Georgia	2.42%
Indiana	2.42%
New Mexico	2.38%
Massachusetts	2.29%
Texas	2.24%
Colorado	2.03%
Ohio	2.01%
Florida	1.96%
Virginia	1.95%
Arkansas	1.85%
West Virginia	1.83%
Oklahoma	1.78%
Pennsylvania	1.76%
Rhode Island	1.74%
District of Columbia	1.45%
Kentucky	1.23%
South Carolina	1.22%
New Jersey	1.12%
Minnesota	1.10%
Oregon	1.09%
Michigan	1.01%
North Dakota	0.97%
Hawaii	0.88%
New York	0.81%
Idaho	0.80%
Tennessee	0.70%
Alaska	0.69%
Montana	0.68%
North Carolina	0.68%
Wisconsin	0.66%
Illinois	0.59%
Nevada	0.56%
Nebraska	0.54%
South Dakota	0.43%
Delaware	0.43%
Wyoming	0.21%
Puerto Rico ⁵²	NA

Figure 47: Aerospace and defense industry payrolls by state⁸

States	2010
California	\$15,300,620,677
Washington	\$8,381,261,440
Texas	\$7,165,077,609
Arizona	\$3,571,769,877
Connecticut	\$3,519,477,482
Florida	\$3,396,805,494
Massachusetts	\$2,989,841,020
Virginia	\$2,794,951,391
New York	\$2,668,714,656
Kansas	\$2,558,087,740
Pennsylvania	\$2,411,121,093
Maryland	\$2,399,950,439
Georgia	\$2,156,345,909
Ohio	\$2,062,542,839
New Jersey	\$1,927,702,549
Colorado	\$1,751,357,143
Missouri	\$1,750,177,656
Alabama	\$1,580,189,295
Illinois	\$1,279,251,116
Michigan	\$1,086,169,109
Louisiana	\$1,076,948,286
Iowa	\$1,009,394,682
Indiana	\$938,605,671
Utah	\$884,924,362
Minnesota	\$856,470,388
North Carolina	\$850,261,288
Mississippi	\$741,276,754
New Hampshire	\$653,512,692
New Mexico	\$576,986,939
Maine	\$550,286,989
Tennessee	\$549,026,954
District of Columbia	\$518,304,748
South Carolina	\$499,609,240
Oklahoma	\$477,418,427
Oregon	\$468,328,655
Wisconsin	\$395,610,808
Kentucky	\$389,302,656
Arkansas	\$327,864,100
West Virginia	\$216,828,361
Rhode Island	\$213,842,768
Vermont	\$202,696,766
Nevada	\$192,792,317
Hawaii	\$167,864,860
Idaho	\$142,840,535
Delaware	\$115,234,865
Puerto Rico	\$97,874,707
Nebraska	\$96,931,816
Alaska	\$92,874,971
North Dakota	\$67,357,088
Montana	\$54,448,524
South Dakota	\$35,791,667
Wyoming	\$19,972,875

Figure 48: Aerospace and defense industry payrolls by industry classification⁸

Industry	Payrolls
Aerospace products and parts manufacturing (33641)	\$40,368,929,098
Search, detection, navigation and guidance systems manufacturing (334511)	\$14,211,885,581
Engineering services (541330)	\$9,406,435,657
Research and experimental development services (541710)	\$6,960,504,675
Shipbuilding (336611)	\$3,840,762,596
Providers of operating staff for support services at client sites - such as janitorial and trash disposal services (561210)	\$1,749,770,736
Computer related services (541519)	\$1,195,221,053
Military land vehicles manufacturing (336992)	\$1,165,970,974
Software services (541511)	\$748,272,174
Ammunition manufacturing - except small arms (332993)	\$693,927,189
Radio and television broadcast and wireless communication equipment manufacturing (334220)	\$645,824,073
Office administrative services (561110)	\$537,855,064
Remediation services (562910)	\$471,889,833
Ordnance and other accessories manufacturing (332995)	\$461,097,894
Guard and patrol services (561612)	\$382,839,579
Business and organizational support services (561990)	\$246,170,503
Services for planning and designing buildings (541310)	\$219,730,154
Service providers for cleaning interiors of buildings and transport equipment (561720)	\$208,401,889
Designing computer systems (541512)	\$187,009,634
Transmission service providers - provides services for transmitting messages in different forms, such as voice, video and text (517110)	\$157,887,542
Environmental advice and assistance services (541620)	\$150,501,197
Data processing services (518210)	\$89,217,858
Landscaping services (561730)	\$36,861,805
On site computer systems management (541513)	\$33,083,840
Management consulting services (541618)	\$23,162,420
Print or electronic publishing services (511199)	\$23,024,501
Small arms ammunitions manufacturing (332992)	\$8,034,782
Small arms manufacturing (332994)	\$7,539,949
Publishers of mailing lists, directories and compilation of other documents (511140)	\$1,088,044

Figure 49: Aerospace and defense exports by state¹⁵

States	2008	2009	2010
Washington	\$21,701,399,787	\$26,667,661,893	\$23,525,394,393
California	\$9,201,411,502	\$8,072,133,984	\$7,734,658,519
Connecticut	\$6,383,339,252	\$6,327,810,523	\$6,919,282,665
Texas	\$7,060,371,764	\$6,190,070,608	\$6,100,064,143
Florida	\$4,365,335,794	\$4,499,642,930	\$5,149,915,510
Ohio	\$5,050,796,375	\$4,332,553,588	\$5,033,045,693
Georgia	\$3,440,559,510	\$3,569,698,141	\$4,699,126,527
Kentucky	\$4,141,399,973	\$4,777,730,416	\$3,616,627,294
New York	\$3,370,482,608	\$2,994,751,454	\$2,734,960,592
Kansas	\$4,384,261,810	\$2,913,621,638	\$2,173,463,871
Arizona	\$2,901,326,518	\$2,299,369,588	\$2,134,795,368
Pennsylvania	\$1,480,509,631	\$1,436,500,241	\$1,580,591,709
North Carolina	\$1,175,351,564	\$1,412,295,239	\$1,567,943,600
New Jersey	\$1,744,654,468	\$1,665,231,454	\$1,502,508,352
Illinois	\$1,662,166,397	\$1,359,863,869	\$1,300,871,059
Tennessee	\$1,069,807,610	\$1,148,172,829	\$1,274,346,027
Michigan	\$712,618,389	\$659,179,451	\$1,109,226,577
Indiana	\$916,299,784	\$864,117,958	\$1,087,195,584
Virginia	\$1,162,385,045	\$914,821,340	\$1,023,171,504
Massachusetts	\$1,119,871,593	\$1,125,781,738	\$1,010,327,367
Missouri	\$1,178,581,395	\$452,216,772	\$862,773,172
District of Columbia	\$430,781,816	\$522,025,169	\$678,774,976
Maryland	\$702,307,773	\$754,871,129	\$622,051,445
Minnesota	\$518,279,390	\$431,274,324	\$600,036,874
Arkansas	\$1,418,761,208	\$1,686,864,841	\$594,166,589
Oregon	\$531,496,650	\$408,906,500	\$507,090,906
Alabama	\$672,109,565	\$579,673,366	\$482,474,639
Wisconsin	\$563,834,051	\$434,058,883	\$445,683,110
Oklahoma	\$396,889,613	\$370,137,710	\$397,353,659
Utah	\$510,113,683	\$325,737,652	\$322,870,670
Idaho	\$23,596,806	\$22,811,449	\$321,585,596
Colorado	\$293,720,716	\$289,859,257	\$316,183,678
Iowa	\$434,176,958	\$365,602,377	\$303,042,134
Hawaii	\$403,489,069	\$197,933,218	\$253,713,813
Louisiana	\$134,962,927	\$152,482,479	\$214,672,528
West Virginia	\$130,809,480	\$121,707,042	\$209,400,104
South Carolina	\$475,467,248	\$248,039,105	\$187,421,997
Mississippi	\$91,181,155	\$115,009,505	\$164,471,126
Nevada	\$124,301,780	\$125,064,089	\$152,052,155
Delaware	\$141,991,296	\$132,398,480	\$125,128,375
New Hampshire	\$118,026,243	\$100,863,240	\$117,389,044
Maine	\$85,383,971	\$176,659,978	\$114,226,659
New Mexico	\$79,519,672	\$79,847,980	\$84,166,544
Vermont	\$57,748,813	\$41,657,878	\$63,429,427
Alaska	\$198,287,660	\$30,639,477	\$60,043,380
Montana	\$18,983,266	\$18,477,081	\$43,193,355
Nebraska	\$119,843,799	\$74,087,096	\$41,517,314
North Dakota	\$19,383,737	\$33,570,268	\$33,160,788
South Dakota	\$5,586,339	\$6,723,505	\$20,935,143
Rhode Island	\$9,518,820	\$12,169,640	\$9,480,161
Puerto Rico	\$4,765,765	\$34,295,188	\$8,519,205
Wyoming	\$2,192,918	\$1,427,342	\$1,743,780
Total Exports	\$92,940,442,958	\$91,578,100,901	\$89,636,268,701

Figure 50: Aerospace and defense imports by state¹⁵

States	2008	2009	2010
Texas	\$7,746,443,309	\$6,308,662,686	\$7,223,839,018
California	\$4,752,824,032	\$3,910,203,196	\$4,984,618,651
Washington	\$3,842,059,598	\$4,230,556,140	\$4,823,681,948
Connecticut	\$4,162,330,479	\$3,790,428,898	\$3,702,521,670
Florida	\$3,107,467,158	\$1,938,802,335	\$2,288,367,532
Georgia	\$1,603,332,862	\$2,003,782,078	\$2,029,030,101
Kentucky	\$2,495,314,378	\$2,064,612,981	\$1,903,376,907
Illinois	\$1,836,783,521	\$1,718,044,389	\$1,892,648,812
North Carolina	\$1,338,189,631	\$1,839,565,019	\$1,645,713,336
Ohio	\$1,981,097,527	\$1,648,271,196	\$1,600,502,366
Pennsylvania	\$982,881,387	\$1,220,303,809	\$1,398,632,706
Arizona	\$1,032,019,144	\$1,007,597,007	\$1,260,449,911
New Jersey	\$1,565,447,014	\$1,347,458,717	\$1,217,380,684
Kansas	\$2,076,937,290	\$1,560,447,966	\$1,181,174,037
New York	\$1,512,052,995	\$1,046,224,781	\$1,042,709,298
Arkansas	\$1,321,877,180	\$1,178,556,825	\$938,771,826
Massachusetts	\$749,089,038	\$718,944,595	\$801,308,440
South Carolina	\$319,320,718	\$260,591,920	\$656,359,784
Colorado	\$662,492,465	\$478,899,683	\$605,303,551
Indiana	\$991,385,673	\$686,009,276	\$598,827,339
Michigan	\$1,031,723,442	\$481,853,375	\$594,303,368
Tennessee	\$898,749,130	\$485,265,444	\$573,393,955
Virginia	\$461,590,368	\$358,026,259	\$439,637,458
Oklahoma	\$498,419,587	\$387,372,836	\$414,934,288
West Virginia	\$274,170,943	\$254,733,810	\$354,324,811
Hawaii	\$16,919,262	\$41,876,449	\$336,652,348
Alabama	\$208,390,511	\$728,018,357	\$325,430,330
Minnesota	\$343,187,876	\$284,680,222	\$317,102,073
Missouri	\$366,631,805	\$461,841,109	\$314,048,889
Oregon	\$354,859,902	\$300,052,560	\$307,532,241
Mississippi	\$173,539,009	\$285,562,725	\$275,536,863
Wisconsin	\$270,313,462	\$248,039,645	\$240,092,770
Maryland	\$171,913,230	\$190,839,691	\$209,257,628
Utah	\$176,621,463	\$424,312,433	\$190,650,095
Louisiana	\$127,854,981	\$84,806,534	\$156,529,590
Vermont	\$100,391,056	\$161,447,045	\$105,523,652
Delaware	\$88,776,609	\$137,144,872	\$95,111,649
New Hampshire	\$104,869,284	\$89,090,283	\$89,435,379
Nevada	\$31,501,618	\$124,439,501	\$82,564,749
Maine	\$26,229,362	\$654,037,845	\$71,301,584
New Mexico	\$161,403,080	\$47,690,733	\$36,579,265
Iowa	\$35,435,065	\$31,218,114	\$27,606,118
Rhode Island	\$22,214,618	\$22,078,112	\$25,274,523
Alaska	\$16,482,552	\$22,093,523	\$23,308,911
Nebraska	\$17,462,936	\$26,638,173	\$20,002,515
Idaho	\$11,932,382	\$15,993,233	\$15,885,644
Montana	\$6,726,604	\$11,545,732	\$11,989,046
Wyoming	\$9,009,775	\$7,722,698	\$11,583,786
North Dakota	\$18,650,304	\$12,308,363	\$8,126,583
District of Columbia	\$1,914,642	\$266,208	\$7,635,148
South Dakota	\$3,216,394	\$2,847,359	\$3,522,483
Puerto Rico	\$2,386,240	\$28,531,847	\$3,520,317
Total Imports	\$50,112,832,893	\$45,370,338,590	\$47,483,615,976

End notes

¹Bureau of Labor Statistics and Census Bureau. Deloitte analysis was also used for aerospace and defense industry figures

²NAICS codes considered for services are: 511140, 511199, 517110, 518210, 541310, 541330, 541511, 541512, 541513, 541519, 541618, 541620, 541710, 561110, 561210, 561612, 561720, 561730, 561990 and 562910

³Office of the Under Secretary of Defense, "DOD releases Fiscal 2010 budget proposal," May 2009; Office of the Under Secretary of Defense, "Fiscal 2005 Department of Defense budget Release," Feb 2004

⁴Bureau of Transportation Statistics (BTS)

⁵Bureau of Labor Statistics; Office of Transportation and Machinery (International Trade Administration, Department of Commerce), 'Flight Plan 2011 Analysis of the U.S. Aerospace industry,' March 2011; Census Bureau; Deloitte analysis

⁶Civilian employees working for the Department of Defense, other defense agencies, FAA and NASA comprise the group of aerospace and defense skilled workers described in this report. It does not include anyone in uniform. Civilians working for military departments such as Naval Sea Systems Command (NAVSEA), Air Force Material Command (AFMC), Army Material Command (AMC), DARPA and others are included in this segment. Civilians working in the following areas comprise this group of skilled workers:

- Civilians working for Army, Navy and Air Force
- Civilians working for the following other defense organizations:
- Defense agencies – DAU, JS, OIG, OSD, CMA, NDU, BTA, DARPA, DCAA, DECA,

DFAS, DISA, DLA, DLSA, DSCA, DSS, DTRA, MDA, PFFA

- DOD Field activities – DMAC, DODEA, DPMO, DTIC, DTRMC, DTSA, HRFA, OEA, TMA, WHS

Bureau of Labor Statistics NAICS code 927110 was used to arrive at the 2010 employment levels at NASA. The employees included for FAA include those working in the Air Traffic Organization (ATO), Aviation Safety (AVS), Airports (ARP), Comm. Space Transportation (AST) and Staff offices

⁷Bureau of Labor Statistics; DoD Personnel & Procurement Statistics, Department of Defense; U.S. Department of Transportation Federal Aviation Administration, "Administrator's Fact book," March 2011; Deloitte analysis

⁸Bureau of Labor Statistics; Deloitte analysis was also used for aerospace and defense industry figures

⁹The U.S. national average annual wage is reported in the National Occupational Employment and Wage Estimates published by the Bureau of Labor Statistics. The wage data is reported semi-annually and is published for May and November. The data are arrived at by using a survey for nonfarm establishments. Data for self-employed persons are not collected by this survey. Source: National Occupational Employment and Wage Estimates, Bureau of Labor Statistics

¹⁰2010 Global Aerospace & Defense Industry Performance Wrap-Up, Deloitte

¹¹Defense Acquisition University, "Improving services acquisition tradecraft, Services acquisition is not for amateurs," Jul-Aug 2011

¹²Bureau of Labor Statistics; Internal Revenue Service; Tax Foundation; Deloitte analysis

¹³Multiplier analyses from Bureau of Economic Analysis' Regional Input-Output Modeling System, Type II Direct effect employment multipliers used; Deloitte analysis

¹⁴Reuters, 'U.S. Missed Foreign Arms Sales Target in 2011,' December 2011

¹⁵Foreign Trade division of Census Bureau reports trade statistics through its publications and USA tradeonline web portal; Deloitte analysis

¹⁶Comparative industry analysis was performed by evaluating the sales to GDP ratio for the following industries:

- Health care is comprised of industries falling under NAICS codes 3391 (medical equipment and supplies manufacturing), 621 (ambulatory health care services), 622 (hospitals) and 623 (nursing and residential care facilities)
- Chemicals (including plastics) is comprised of industries falling under NAICS codes 325 (chemical manufacturing) and 326 (plastics and rubber products manufacturing)
- Food and beverages is comprised of industries falling under NAICS codes 311 (food manufacturing) and 312 (beverage and tobacco product manufacturing)
- Information technology is comprised of industries falling under NAICS codes 334 (computer and electronic product manufacturing), 516 (internet publishing and broadcast) and 518 (internet service providers, web search portals and data processing services)

– Automobile is comprised of industries falling under NAICS codes 3361 (motor vehicle manufacturing), 3362 (motor vehicle body and trailer manufacturing) and 3363 (motor vehicle parts manufacturing)

– Machinery manufacturing is comprised of industries falling under NAICS code 333 (machinery manufacturing)

– Primary metal manufacturing is comprised of industries falling under NAICS code 331 (primary metals manufacturing)

Source: Census Bureau; Bureau of Economic Analysis; Deloitte analysis

¹⁷The value of this sales tax rate is a numerical average of all of the individual state sales tax rates. States with zero sales tax rates are also included when calculating numerical averages. The values of sales tax rates are as of January 1st, 2011. Source: Tax Administration

¹⁸These taxes include Federal individual taxes, state individual taxes, employee contributions to social security and Medicare taxes and state sales taxes due to employee spending

¹⁹DoD Personnel & Military casualty statistics; Department of Defense; Deloitte analysis

²⁰The Revenue Passenger Mile (RPM) metric highlighted in this section is defined as total system miles (scheduled and non-scheduled) for both domestic and international passenger air travel. Source: Bureau of Transportation Statistics

²¹Fatalities per 100 million aircraft miles include all scheduled and nonscheduled service accidents involving all-cargo carriers and commercial operators of large aircraft operating under 14 CFR 121 when those

accidents occurred during operations which were conducted when the carriers/operators were following appropriate FAA safety regulations. Since March 20, 1997, 14 CFR 121 includes aircraft with 10 or more seats formerly operated under 14 CFR 35. This change makes it difficult to compare pre-1997 data for 14 CFR 121 and 14 CFR 135 with more recent data. Source: Bureau of Transportation Statistics, National Transportation Safety Board (NTSB)

²²Seat miles per gallons data are for U.S. owned carriers only. Operations of foreign-owned carriers in or out of the U.S. are not included in this chart. Source: Bureau of Transportation Statistics

²³Mitch Waldrop, "DARPA and the internet revolution

²⁴NATO Review, "Egypt and Facebook: time to update its status," 2011

²⁵Hanover College, "Summary and Excerpts from Thomas Friedman's The world is flat (2006)"

²⁶The chart highlighted here refers to the internet users from the U.S. only. Source: World Bank

²⁷States of California, Indiana, Louisiana and Pennsylvania have the same number of employees in the industry segment which manufactures of military land vehicles. We chose Pennsylvania as the state with highest employment in this industry because it has the highest value of exports in this industry segment

²⁸The taxes paid by companies and individuals in Puerto Rico have not been estimated due to unavailability of data

²⁹Metro Denver Economic Development Corporation, "Aerospace Colorado Industry Cluster Profile," June 2006

³⁰Department of Development, Ohio, "Ohio's Aerospace and Defense industries"

³¹Plane-crazy.net

³²Bureau of Labor Statistics; Bureau of Economic Analysis; Census Bureau; Deloitte analysis

³³Aerospace and Defense Industries Association of Europe; Deloitte analysis

³⁴Core financial performance metrics are adjusted for one-time charges and non-recurring expenses. Source: 2010, Global Aerospace & Defense industry performance wrap-up, Deloitte; Deloitte Analysis

³⁵Industry comparison metrics were sourced from Compustat and S&P Aggregates. We used net income after taxes to arrive at the profit per employee estimates for the selected industries. Deloitte analysis was used to calculate aerospace and defense industry metrics

³⁶Total U.S. average values were calculated using values from Compustat and S&P Aggregates. A&D values shown are based on Deloitte analysis and may differ from Compustat/S&P Aggregates data

³⁷Press release from Challenger, Gray & Christmas, Inc.

³⁸Capital IQ

³⁹The total exports from the U.S. for 2010 are estimated to be \$1.298 trillion. Source: CIA World Fact Book

⁴⁰Federal Aviation Administration, "The economic impact of civil aviation on the U.S. economy," August 2011

⁴¹Small Arms Survey, IBIS reports and company SEC filings

⁴²Epipeline

⁴³Manufacturing-related NAICS Codes: 332992, 332993, 332994, 332995, 334220, 334511, 33641, 336611 and 336992

⁴⁴Trade in the present context describes both exports and imports

⁴⁵Under US tax laws, an unincorporated business (e.g., a Limited Liability Company, a general or limited partnership, a sole proprietorship, etc.) or an eligible electing small business corporation (i.e., an "S corporation") may not be subject to a business level income tax; instead, the business' taxable income passes through to the business' owners and is typically subject to tax on the owners' income tax returns. This study has not estimated potential income-based taxes paid by the owners of any aerospace and defense companies treated as a pass-through entity for US federal income tax purposes

⁴⁶The results may be over stated or understated because some companies may not pay federal income taxes even if they generate revenues

⁴⁷From 1985 to June 30, 2011, the total UI tax rate was 6.2 percent, inclusive of a 0.2 percent "temporary" surtax then in effect

⁴⁸In most states, the legal incidence of UI taxes falls on employers. However, Alaska, New Jersey, and Pennsylvania impose UI taxes on employees. For simplicity purposes, we have not considered any federal tax credits

which might be applicable for companies that may also be required to remit state unemployment taxes

⁴⁹Because a number of exemptions, deductions, adjustments and credits could be available to reduce an employee's tax liability, we have decided to reduce an employee's taxable wages by \$18,700 before computing tax using the married filing jointly tax brackets. Tax exclusions for individuals married filing jointly for the year 2010 is \$18,700, the sum of standard deductions and individual exemptions for that year. We have used the same value of exemptions for prior years, which may lead to an understatement of federal individual income taxes paid throughout our time period

⁵⁰The California Research Bureau in its publication describes an algorithm for distributing income to states. This algorithm uses a complex weighting mechanism (undisclosed) for sales, wages and property held by the firm in the state and those at the national level. Due to limited data availability regarding the weighting mechanism, we created our weighting mechanism on the basis of revenue ratios. Source: California Research Bureau, "Other states' incentives to attract or encourage Aerospace manufacturing," Rosa Maria Moller

⁵¹We did not have data regarding tax rates for Puerto Rico. States of South Dakota and Nevada had a zero state tax rate in 2010

⁵²The GDP of Puerto Rico was not available and hence its contribution is shown as 'NA'

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