



2017 Global aerospace and defense sector outlook
Growth prospects remain upbeat

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Summary

The global aerospace and defense (A&D) sector is likely to experience stronger growth in 2017, following multiple years of positive, but a subdued rate of growth. Deloitte forecasts the sector revenues will likely grow by about 2.0 percent in 2017.¹

Stable global gross domestic product (GDP) growth, relatively lower commodity prices including crude oil, strong passenger travel demand, especially in the Middle East and Asia Pacific region, will likely drive the commercial aerospace sub-sector growth. Commercial aircraft backlog is at an all-time high of ~13,500 aircraft units, representing more than nine and a half years of current annual production rate.² Specifically, strong global airline passenger traffic and improved global airline profits, primarily on account of lower fuel costs will likely drive increased large commercial aircraft production and in turn commercial aerospace revenues in 2017 and 2018. We expect about 96 more aircraft to be produced in 2017 as compared to 2016.³

On the defense side, resurgence of global security threats, expected increases in US defense budgets, as well as higher defense spending from other major regional powers such as Japan and India will likely promote global defense sub-sector revenue growth in the near future. In particular, we see an upside for US defense expenditure, given the outcome of the recently concluded US elections. In addition to boosting the number of troops, the US military will likely add more aircraft and ships, which will drive revenue growth at large defense primes over the next few years.

2017 Deloitte forecast

- Global A&D sector revenue growth is likely to be around 2.0 percent
- Commercial aerospace subsector revenues are likely to remain flat, experiencing only a 0.3 percent increase – marginal growth expected as aircraft production recovers in 2017 after a slowdown in 2016
- Defense subsector revenues are likely to grow at a much faster 3.2 percent in 2017 as defense spending in the US has returned to growth, after multi-year declines in defense budgets and future growth may be driven by the newly elected US administration's increased focus on strengthening the US military
- Operating earnings for the commercial aerospace subsector are expected to grow 20.6 percent, while defense subsector's operating earnings will likely rise 7.0 percent
- European A&D sector is expected to record a 2.5 percent YoY increase in revenue and 9.3 percent growth in operating earnings in 2017
- For the US A&D sector, revenue is expected to be up 1.7 percent, with a strong spurt of 12.7 percent in operating profits

Commercial aerospace sub-sector outlook

The global commercial aerospace sub-sector will likely experience a 0.3 percent increase in revenues in 2017.⁴

A slight recovery after a slowdown in 2016 will primarily be due to aircraft production levels resuming growth in 2017, driven by strong demand for next-generation aircraft and growing passenger traffic, especially in the Asia-Pacific and the Middle East regions. Although 96 additional large commercial aircraft are expected to be produced in 2017, continued pricing pressure and product mix changes by customer airlines will likely result in only a marginal change in commercial aerospace sub-sector revenues. Major aircraft manufacturers, Airbus and Boeing, have indicated production rate increases will occur in 2017 and 2018. Airbus' A320neo is likely to ramp up production in 2017, whereas,

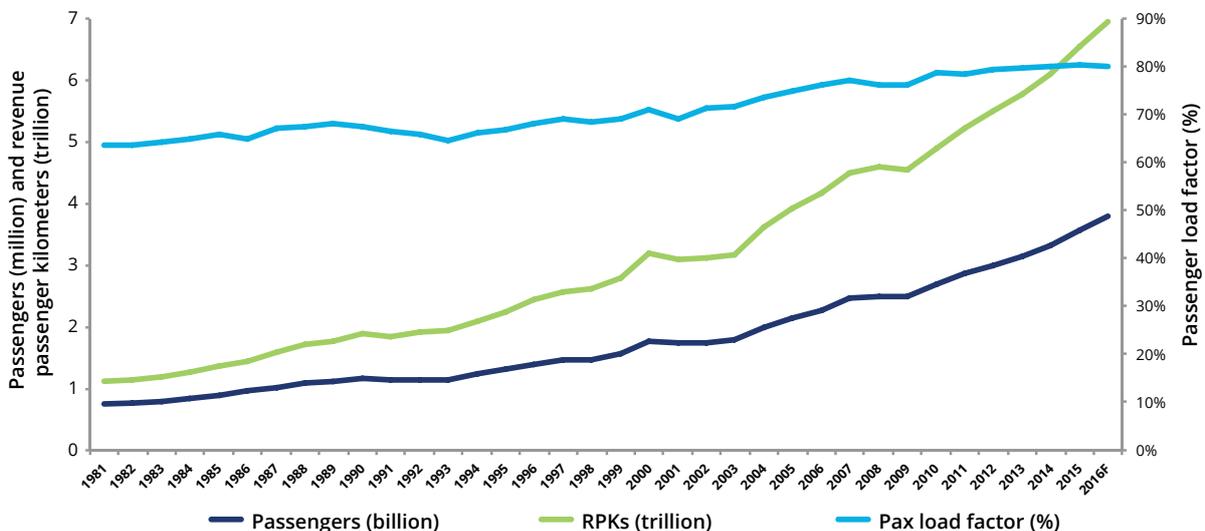
Boeing estimates that the production rate of its 737 will rise from 42 per month currently to 47 per month in 2017 and 52 per month in 2018.⁵

Travel demand (revenue passenger kilometers or RPKs) has been increasing at a compounded annual growth rate (CAGR) of 4.7 percent over the last ten years, with passenger enplanements rising from slightly over 2.0 billion to more than 3.5 billion annually during this period.⁶ Increase in travel demand has been primarily driven by global demographics and wealth creation in Asia and the Middle East, resulting in a significant order increase for new aircrafts.

Passenger and freight traffic are likely to grow at an average annual growth rate (AAGR) of 4.8 percent and 4.2 percent, respectively, over the next 20 years,⁷ contributing to higher aircraft production. Several years of above average order intake has resulted in commercial aircraft backlog at the end of 2015 being at an all-time high of ~13,500 aircraft units, representing more than nine and a half years of current annual production.⁸

As illustrated in Figure 1, passenger travel demand increased more than five times from 1981 to 2016, while passenger load factor (utilization of aircraft) has risen 25.6 percent (nominally growing from 63.7 percent to 80.0 percent) during the same

Figure 1: Global airline traffic (1981 to 2016E)



Source: Deloitte analysis of the data from International Air Transport Association (IATA), "Fact Sheet," accessed in November 2016, https://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf; and Airlines for America, "Annual Results World Airlines," accessed in November 2016, <http://airlines.org/data/annual-results-world-airlines/>

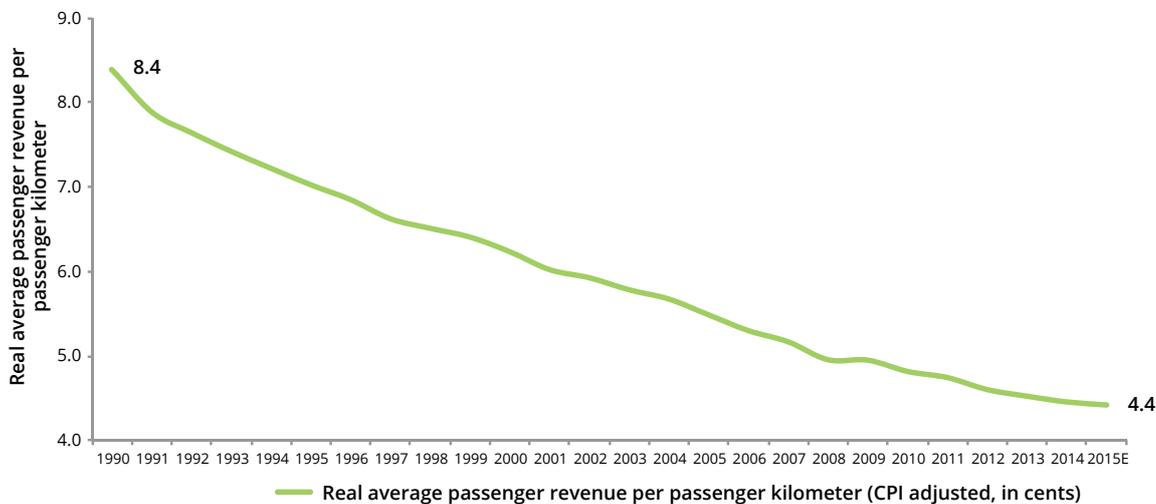
period.⁹ Moreover, the number of people flying per year continued to rise, with a greater than four times increase over 1981 to 2016, driven by affordable ticket pricing and route availability.¹⁰ As shown in Figure 2, there has been a 47.0 percent decrease (consumer price inflation or CPI-adjusted) in airfares since 1990, leading to increased demand for air travel.¹¹

Total global demand for new aircraft production over the next 20 years is estimated to be 35,155 aircraft (excluding regional jets).¹² Figure 3 illustrates sales order and production history of commercial aircraft from 1981 through 2016, showing a 220.0 percent increase in production in that period.¹³

Using a seven-year moving average, production levels over the last 20 years have increased 120.5 percent since 1996.¹⁴ Over the next decade, commercial aircraft annual production levels are anticipated to increase an estimated 29.3 percent.¹⁵ With such growth expected, there are two significant trends and challenges to consider—the attractiveness of this market and the resulting entrance of new global competitors to the existing duopoly, and the impact on the supply chain.

“Increase in travel demand has been primarily driven by global demographics and wealth creation in Asia and the Middle East, resulting in a significant order increase for new aircrafts.”

Figure 2: Real average passenger revenue per passenger kilometer (CPI adjusted, in cents)



Source: Deloitte analysis based on data from IATA, Industry Statistics, June 2016 http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf

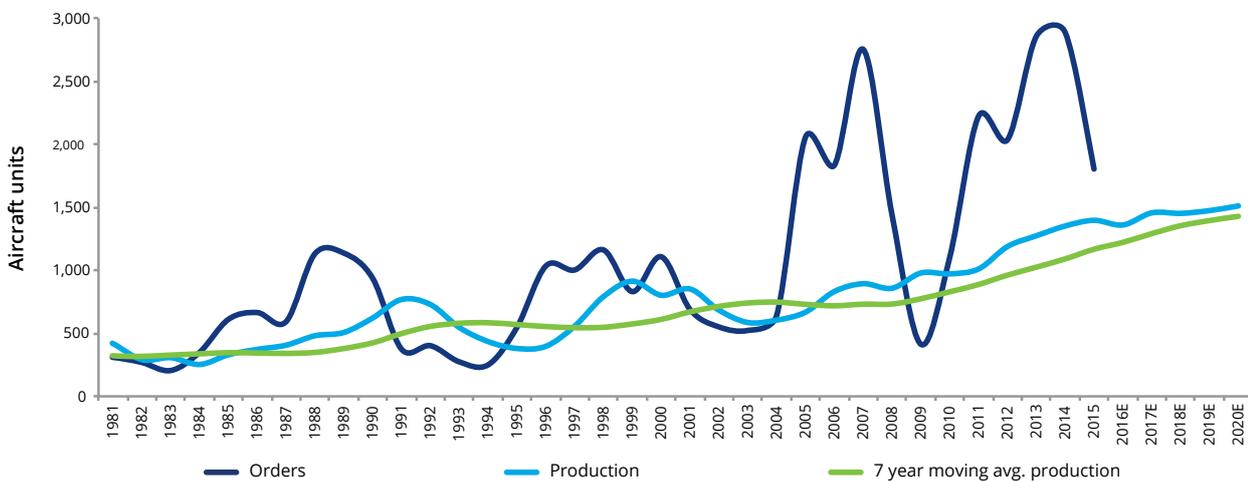
After an unexpected slowdown in anticipated production in 2016 to 1,360 units, it is estimated that 1,456 commercial aircraft will be produced in 2017, which is a 7.1 percent increase over the estimated 2016 production, and a 22.5 percent increase in annual production compared to five years ago.¹⁶ Factors driving the slowdown in production in 2016 include transitioning to new aircraft models, delivery deferrals as well as some supply chain related issues.¹⁷ In five years, the sector is

expected to produce 1,550 aircraft, a 14.0 percent increase from 2016.¹⁸ Figure 4 shows aircraft production since 2009, as well as the annual estimated production through to 2035, demonstrating the solid growth experienced by the commercial aerospace sub-sector.

However, some weakness might persist in the demand for twin-aisle aircraft as low fuel costs and a surplus of second-hand aircraft have delayed airlines' needs to upgrade existing fleets. In July 2016,

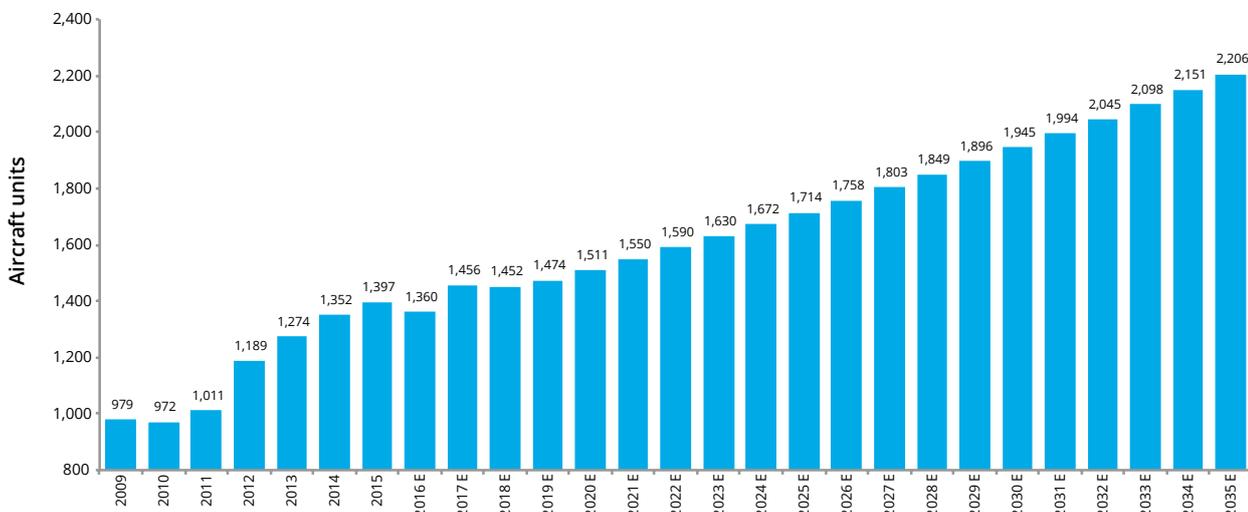
Airbus announced plans to reduce A380 output to one per month in 2018 from 2.5 per month, citing weak demand for its largest aircraft. Likewise, Boeing has also disclosed that it is reasonably possible that it could decide to end the production of 747-8 should it be unable to obtain sufficient orders.¹⁹ In December, 2016, Boeing also announced reduction in production of 777 jetliner to five aircraft per month, beginning August, 2017 and further to 3.5 aircraft per month from 2018.²⁰

Figure 3: History and forecast for large commercial aircraft orders and production (1981 to 2020F)



Source: Deloitte analysis of the following data: The Boeing Company, "Order and deliveries," accessed in November, 2016 <http://active.boeing.com/commercial/orders/index.cfm>; Airbus Group, "Orders and deliveries," accessed in November, 2016, <http://www.airbus.com/company/market/orders-deliveries/>; UBS, US Aerospace and Defense Playbook, 14 October 2016; and Credit Suisse, Global Aerospace and Defense, 27 May 2016.

Figure 4: Aircraft production (2009 to 2035F)



Source: Deloitte analysis of the following data: The Boeing Company, Current Market Outlook (2016–2035), July 2016, http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/assets/downloads/cmo_print_2016_final.pdf; and Airbus Group, Global Market Forecast (2016–2035), July 2016, <http://www.airbus.com/company/market/forecast/>.

As the overall commercial aerospace market grows, new aircraft production programs are emerging from other regions, particularly in China and Russia. Although China has been attempting to produce and deliver a domestic manufactured commercial aircraft for nearly four decades, it has not seen great success. With the C919, China seems to be more focused on the program and is also working with foreign suppliers that have experience in various aircraft programs.²¹ However, these new entrants will face multiple challenges, including procurement of orders from established carriers, risk of budget and schedule over-runs in product development, as well as delays in establishing a track record of reliable, safe, and trouble-free operation, which could be a lengthy process

Furthermore, the global supply chain faces a challenge to ensure that increasing requirements for capacity, throughput, quality, on time delivery and pricing can be met. The aerospace supply chain is expected to continue its transformation to reduce costs, respond quicker and to invest more in product innovation, which may result in further industry consolidation as some of the smaller companies may not be able to meet the increased financial, program management, skills, risk-taking and investment requirements.

Consolidation by part family, i.e. components, aero-structures, electronics, interiors, etc. is likely to continue for the next few years as

companies focus on gaining economies of scale and providing required investment in people and tooling. In July 2016, Rolls-Royce announced a deal to fully acquire engine component maker, ITP.²² Also, in July 2015, Precision Castparts Corp. (a Berkshire Hathaway company), which manufactures commercial and military airframe aero-structures acquired Noranco, a manufacturer of machined and fabricated components for aero-engine, landing gear and airframe applications. As the continued demand of the flying public for lower airfares ripples through the value chain—from OEMs and on down—competitive pricing in the supply chain is anticipated to be an ongoing challenge in 2017 and beyond.



Defense sub-sector outlook

Global defense sub-sector revenues are expected to grow 3.2 percent in 2017 as defense spending in the US has bottomed out and returned to growth, after multi-year declines in defense budgets.²³

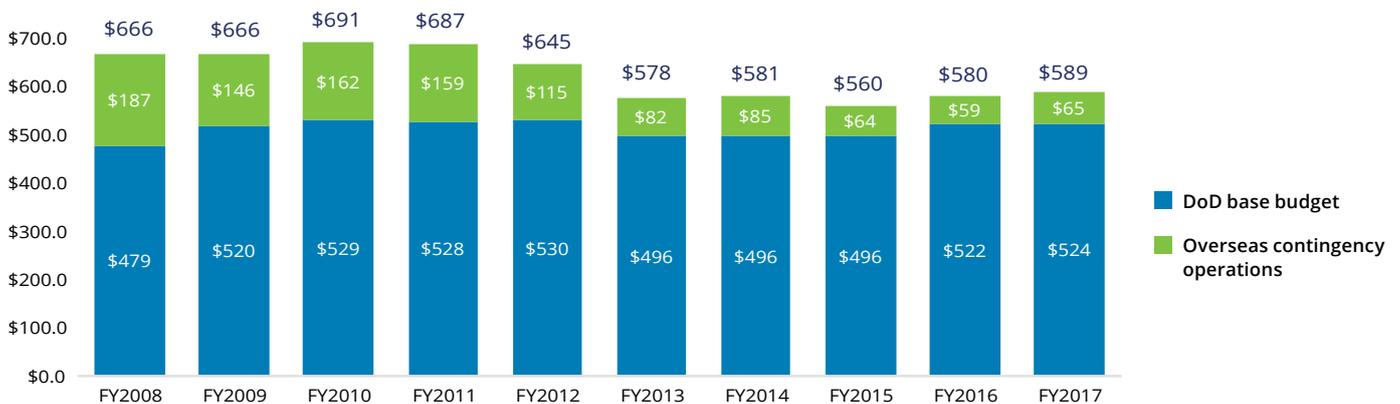
In 2017, growth is also expected to be driven by the newly elected US administration’s increased focus on strengthening the nation’s military. President-elect Donald Trump recently spoke about increasing defense budgets to increase the ships and aircraft fleet and eliminating sequester, which is likely to result in higher defense spending.²⁴ Figure 5 illustrates the US Department of Defense (DoD) budgets from fiscal year (FY) 2008 through to FY2016, showing a 5-year decline from FY2010 to FY2015, with an increase of US\$20.0 billion in FY2016 and US\$9.0 billion in FY2017, inclusive of Overseas Contingency Operations (OCO) funding.²⁵

With rising global tensions, international demand for defense and military products is increasing in the Middle East, Eastern Europe, North Korea, and the

East and South China Seas. This is in turn resulting in increased defense spending globally, especially, in the United Arab Emirates (UAE), Saudi Arabia, India, South Korea, Japan, India, and China – many of these countries have already started to increase purchases of next generation military equipment.

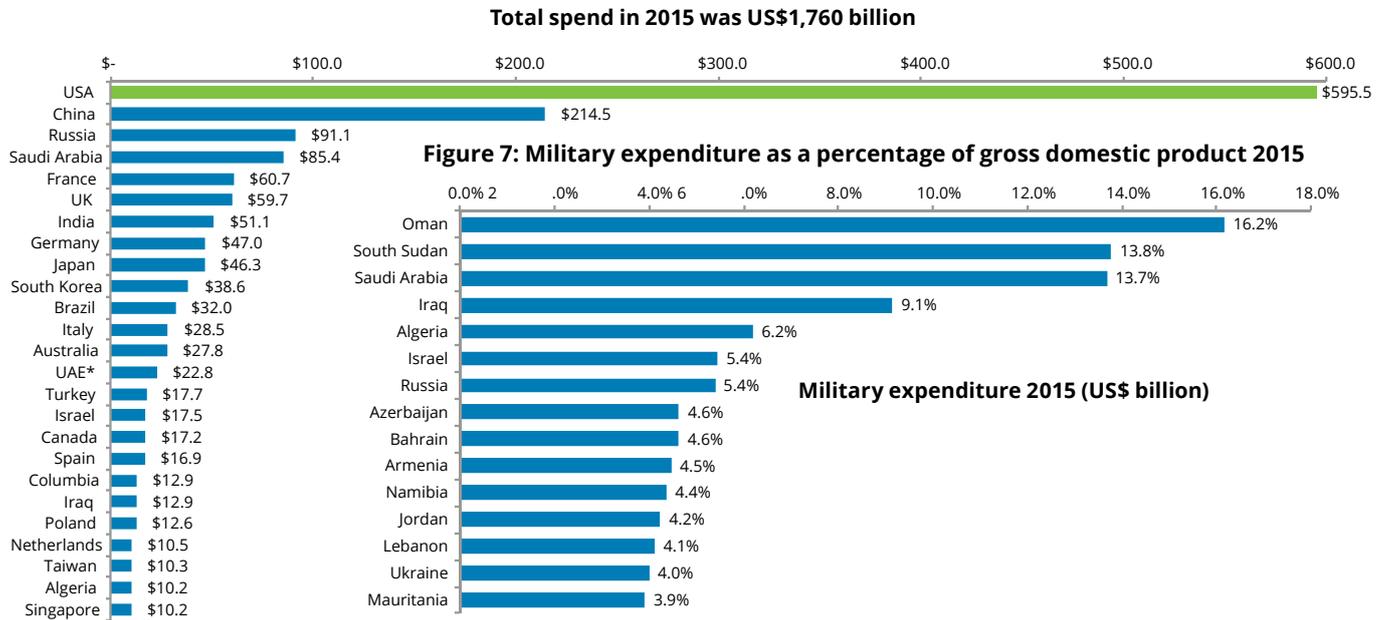
Figure 6 illustrates the top 25 military spending nations in the world. The US remained the largest defense spending nation, representing 34 percent of the total global military spend of US\$1,760 billion in 2015.²⁶ Many Middle Eastern and African countries spend a greater percentage of their GDP on military expenditures, with Oman, South Sudan, and Saudi Arabia being the top three. With US\$85.4 billion in military expenditure in 2015, Saudi Arabia was also the fourth largest defense spender globally.²⁷

Figure 5: US Department of Defense budget in US\$ billion (fiscal years 2008 to 2017)



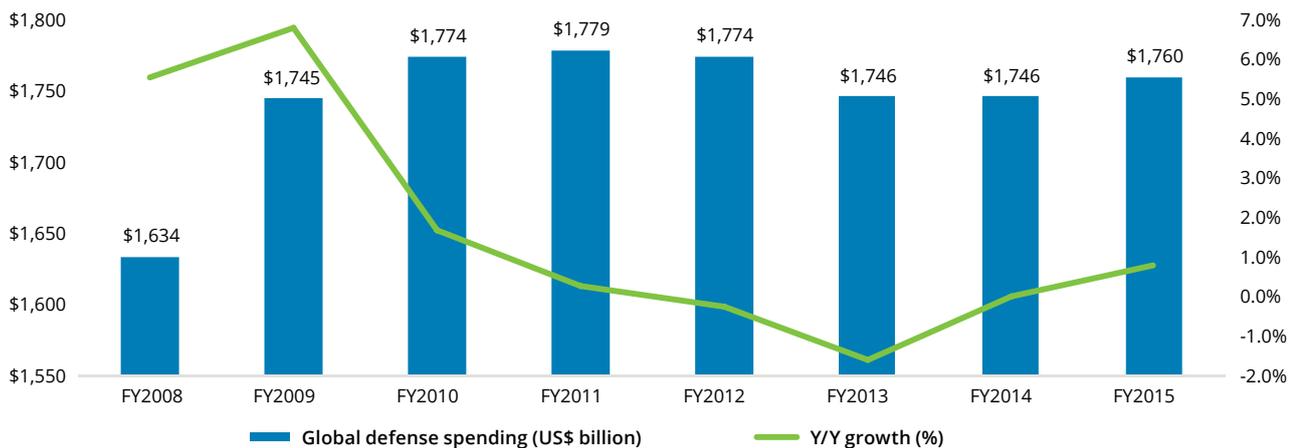
Source: Deloitte analysis of the data from the Office of the Under Secretary of Defense (Comptroller) in the United States Budget Request Document, accessed in November 2016, <http://comptroller.defense.gov/>.

Figure 6: Top 25 military spending nations 2015 (US\$ billion)



Source: Deloitte analysis of data from Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, accessed in November 2016, http://www.sipri.org/research/armaments/milex/research/armaments/milex/research/armaments/milex/milex_database. Note: Military expenditure data for 2015 is not directly comparable with the data in our previous outlook as this is being converted by SIPRI using constant currency exchange rates (based on 2015 average exchange rate)

Figure 8: Global defense spending 2008-2015 (US\$ billion)



Source: Deloitte analysis of data from Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, accessed in November 2016, http://www.sipri.org/research/armaments/milex/research/armaments/milex/research/armaments/milex/milex_database.

What can defense contractors expect in 2017 and beyond?

Global tensions persisted in 2016, with many affected countries planning for and taking actions to recapitalize and improve their defense posture. Threats continue to evolve from traditional land based force on force, to maritime disputes, hybrid warfare, island building, high seas piracy, urban insurgency, lone-wolf civil attacks, cyber-attacks, to anti-access, area denial. Moreover, the new US administration has indicated that the US Air Force and Navy investment account spending, force structure and operational assets are to increase significantly.²⁸ The US and allies in the South China sea region are expected to pursue more aggressive intelligence, surveillance and reconnaissance operations and might even carry out joint patrols with Japan. Also, the conflict between Saudi Arabia and Yemen carried on in 2016, where the US government continued to provide military support and aid to Saudi Arabia. In addition, Russia and Ukraine continue to be at odds related to Russia's takeover of Crimea and their military actions in eastern Ukraine. North Korea continues to threaten its neighbors with its nuclear ambitions and aggressive rocket launches. The Islamic State (ISIS) continues to be a major threat in Syria, Iraq, and Afghanistan and is also carrying out terror strikes in Europe, Africa, and elsewhere. With the bombings and terror attacks in Brussels, Turkey, Nice, Paris, Beirut, Mali, the Sinai Peninsula, as well as other places, countries across the globe have joined the fight against terrorism.

Several governments have already started increasing their defense budgets to address security threats and to battle against terrorism. For instance, China, Russia, Saudi Arabia, and South Korea's 2015 military expenditure rose by 7.4 percent, 7.5 percent, 5.7 percent, and 3.6 percent year-on-year, respectively.²⁹ For defense contractors, this represents an opportunity to place more equipment and military weapons systems with these countries. Key defense products which are likely to experience increased interest from buyers, include armored ground vehicles, ground attack munitions, light air support aircraft, intelligence,



surveillance and reconnaissance electronic sensors, cyber protections, maritime patrol ships and aircraft, as well as provision for equipment maintenance and sustainment, as the military operations tempo continues to increase.

What are the important avenues for defense companies to grow?

With US defense spending experiencing a slowdown in the last few years, US defense firms increased focus on seeking growth opportunities via foreign military sales (FMS), mainly in markets such as, India and the Middle East. In fact, US FMS increased from US\$21.36 billion in FY2010 to a record US\$46.6 billion in FY2015, a 118.2 percent growth over the period. US FMS for FY2016 were US\$33.6 billion, however, comparison of YoY sales may be misleading as some of the pending deals to be announced in FY2016 will be accounted for in the next fiscal year.³⁰ FY2017 is expected to be another record year for US FMS. This will be largely driven by the helicopter, missile, and other military sales to the Middle East, which have already

“Global tensions persisted in 2016, with many affected countries planning for and taking actions to recapitalize and improve their defense posture.”

been cleared by the State department. According to the Defense Security Cooperation Agency (DSCA), the latest approvals of US arms sales overseas led to the total US FMS notifications to US\$41.8 billion for FY2017.³¹ Also, given the increasing defense spending by India and the Middle East, foreign military sales are anticipated to remain strong in 2017 and 2018. In addition, Europe recently announced a major increase in defense spending after the US president called for NATO members to dedicate 2.0 percent of their GDP to military expenditure. The proposed increase in spending is approximately US\$5.8 billion



annually. This will primarily be utilized for buying more hardware and increase R&D spending to US\$500 million a year.³² Japan also announced a record high defense budget of US\$44.6 billion as the nation seeks to cope with security threats from China and North Korea. This is likely to contribute to increased US FMS going forward.³³

Another avenue for growth will be acquisitions and joint ventures. As the defense sub-sector growth slowed down amid declining US DoD and global Ministry of Defense (MoD) budgets, defense companies resorted to acquisitions. Also, joint ventures in the sub-sector have gained traction as it is often used by global defense businesses to access new markets, reduce competition, as well as to share risks and costs. Joint ventures helped defense players to strengthen long-term relationships and also enable these companies to enter certain foreign markets that have high entry barriers. Some of the key joint ventures announced in the past

twelve months include Boeing and Tata Advanced Systems (December 2015) for manufacturing fuselages of Apache helicopters in India³⁴ and Raytheon (March 2016) for the development of unmanned surface vessel in the UAE.³⁵

In terms of succeeding with international growth, several important factors should be considered including:

- Presence either with a local office or with sales representatives
- Patience as it takes a long time
- Private ownership provides a long term view but may not be possible for most companies
- Partnerships and relationship on the ground at international locations, including joint ventures and licensing agreements
- Pricing as cost leadership still matters
- Products with high/low mix to capture a bigger market for a 80 percent solution that is 25 to 50 percent of the cost
- Acquisitions to help jump start an enduring presence
- Technology leadership to produce a better product
- Offset strategies to determine who will be ultimately responsible, even in a junior/non-majority partner arrangement
- Investment to build a presence in anticipation of longer term success
- Confirm there is a market and there is budget to spend

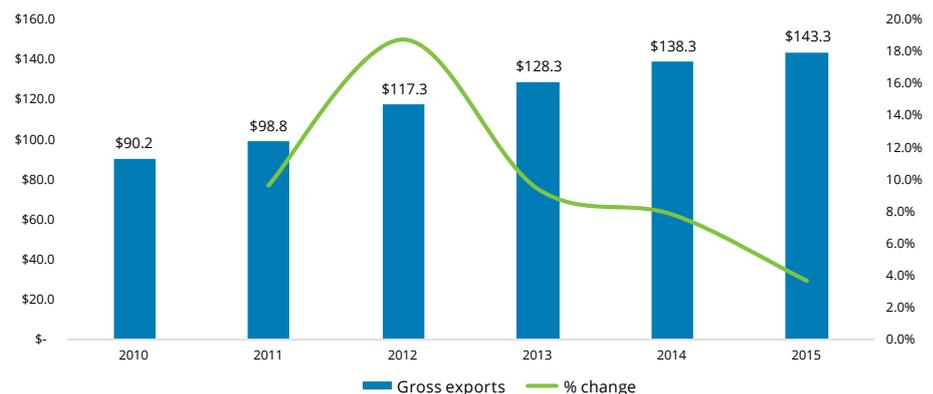
- Strength of local supply chain
- Ensure compliance of International Traffic in Arms Regulations (ITAR), which controls the export and import of defense related products and services on the US Munitions List (USML).

Going forward, acquisitions and cross-border joint ventures in the global A&D sector are expected to gain further attractiveness as global defense spending returns to growth and foreign investments norms are being relaxed in emerging markets.

What has been the trend for US A&D sector exports?

Figure 9 illustrates the increase in US gross exports of A&D sector products from 2010 to 2015. Although exports have experienced growth over this period, there has been a slight dip in the magnitude of growth in US A&D exports recently, mainly due to the countervailing forces of a strong US dollar, competition from the global marketplace, especially Russia and China as well as the inability of the Export-Import bank board to authorize transactions above US\$10 million, due to a lack of a voting quorum.³⁶ Recently, in December, 2016, the US Congress declined to permit a waiver for the Export-Import Bank to approve higher value transactions. There is still some ambiguity about the fate of the bank as the new US administration has yet to take a decision on its complete restoration.³⁷

Figure 9: US aerospace and defense sector gross exports in US\$ billion (2010 to 2015)



Sources: Deloitte analysis of data from the U.S. Census Bureau, accessed in November 2016, www.census.gov/; and UN Comtrade | International Trade Statistics Database, accessed in November 2016, www.comtrade.un.org/.



This is likely to create some uncertainty with respect to US A&D exports in 2017. However, given the expected increase in commercial aircraft sales and production volumes as well as growth in military products and weapons systems, contribution of US A&D exports will continue to remain significant in the global A&D marketplace.

There is a likelihood of the market becoming crowded as competitors from China, Russia and later Japan and India emerge, leading to a slight decline in western countries' share of exports.

Is the US A&D sector still more efficient than rest of the world?

The global A&D sector's productivity remains high, stabilizing in growth after a period of improvement, which was largely due to increased process automation and efficiency initiatives, and lower overhead costs brought about from economies of scale gain through mergers and acquisition activity. Efficiency, defined as operating earnings per employee among global A&D companies decreased marginally by 0.7 percent to US\$34,276 in 2015 compared to US\$34,523 in 2014.³⁸ Efficiency levels continue to differ between the US and Europe. While the US recorded operating earnings per employee at US\$41,218 in 2015, it was much lower for rest of the world at US\$23,364 and US\$28,521 for Europe.³⁹

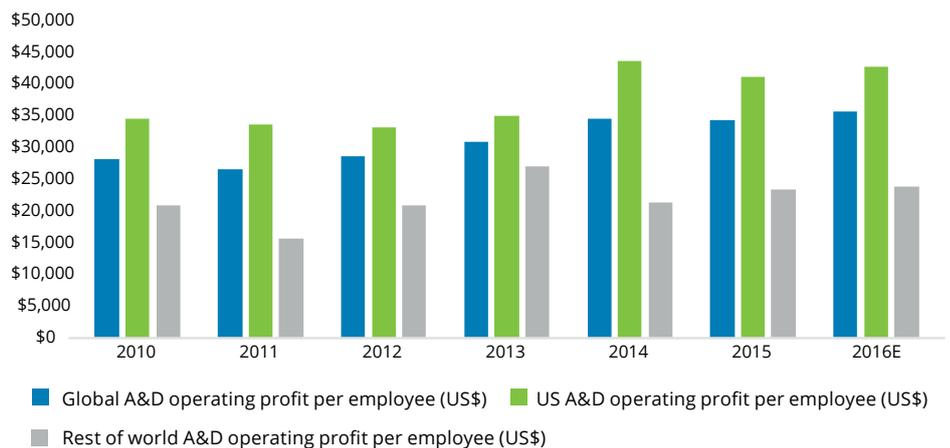
US companies have experienced more recent success in improving employee productivity compared to companies in Europe and Asia due to its greater flexibility to rationalize/close factories, adjust employee levels, and manage cost structures in a timely manner. Figure 10 shows the gap between US productivity and the rest of the world, where US headquartered companies recorded a 3.6 percent average annual growth rate improvement in operating earnings per employee from 2010 to 2016 (estimates), over the 2.3 percent improvement for the rest of the world during the same period.⁴⁰ The average operating margin for US companies in 2015 was 11.6

percent, while European companies reported average operating margins of 8.5 percent.⁴¹

Efficiency initiatives by commercial aerospace companies, especially the larger companies, include increased concentration of their supplier base, risk sharing with suppliers, and factory automation have led to improved productivity levels amongst other initiatives. Also, a decrease in overhead costs experienced as a result of higher merger and acquisition activity, also contributed to higher productivity, all similar to the broader sector.

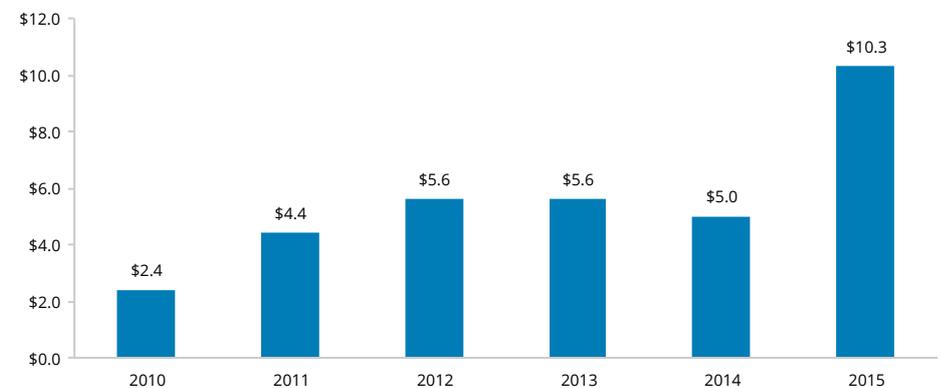
Continued productivity improvement in engineering and manufacturing operations is a key element allowing flexibility in pricing products. Customers—whether airlines or government defense procurement officials—continue to expect more for less: more functionality, more reliability, less cost for maintenance, lower acquisition prices, and better, more competitive products. The global A&D sector is expected to continue to experience pricing pressure and a resulting need to be more efficient and to reduce costs in 2017.

Figure 10: Global, US, and rest of the world operating earnings per employee in US\$ (2010 to 2016E)



Source: Deloitte analysis of aerospace and defense annual reports for 2010, 2011, 2012, 2013, 2014, 2015 and quarterly reports for 2016 and information from DTTL's annual Global A&D sector financial performance study for the years 2011, 2012, 2013, 2014, 2015, and 2016.

Figure 11: Global A&D sector one-time charges in US\$ billion (2010 to 2018F)



Source: Deloitte analysis of aerospace and defense annual reports for 2010, 2011, 2012, 2013, 2014, 2015 and quarterly reports for 2016 and information from DTTL's annual Global A&D sector financial performance study for the years 2011, 2012, 2013, 2014, 2015, and 2016.

Are one-time charges and write-downs increasing?

In 2015, the global A&D sector experienced a significant increase in one-time charges to US\$10.3 billion compared to US\$5.0 billion in 2014.⁴² This was primarily led by program delays, cost overruns and funding issues faced by the sector players – both commercial and defense. Going forward, the magnitude of increase in one-time charges is anticipated to slow down, however, the sector is likely to continue recording one-time charges in the near-term. The asset write-downs post Brexit, major change in currency valuations (mainly the Pound Sterling and the Euro), as well as continuing program delays and cancellations are major drivers of this.⁴³

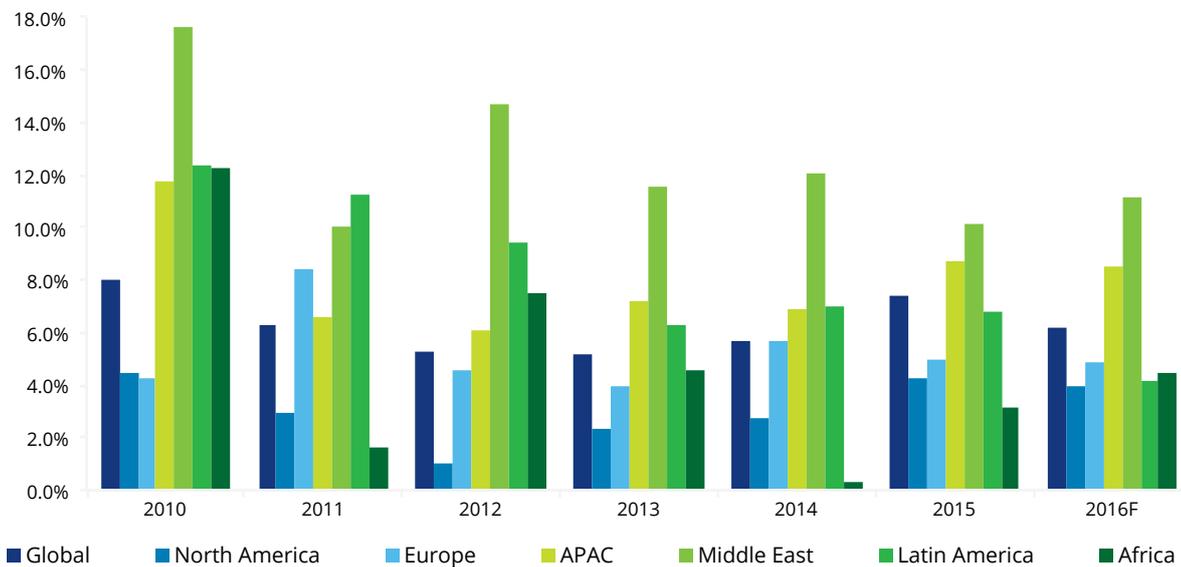
What are the key growth regions for the A&D sector?

Passenger travel demand is increasing in countries and regions which are experiencing continued wealth creation – India, China, and the Middle East in particular. These markets will continue to be the focus regions for commercial aerospace companies to capitalize on in the near future. Figure 12 illustrates the strong growth in passenger traffic in Asia Pacific and the Middle East regions during 2010 to 2016F.

Looking at the defense sub-sector, military expenditure in the US has declined 18.7 percent over the 2010 to 2015 period, while, Europe’s defense spending remained flat over the same

period.⁴⁴ Regions that experienced strong growth in military expenditure during 2010 to 2015 include the Middle East and Asia and Oceania.⁴⁵ Moreover, the share of military expenditure from the Asia and Oceania region rose from 20.1 percent in 2010 to 25.6 percent in 2015, whereas, Americas’ contribution to the global military spending declined from 47.8 percent in 2010 to 39.1 percent in 2015.⁴⁶ Hence, global defense companies dependent on the US and Europe are increasing their focus on regions such as India, China, the Middle East, and Russia.

Figure 12: Passenger traffic (RPK) year-on-year growth by region (2010 to 2016F)



Source: Deloitte analysis based on data from IATA, Industry Statistics, June 2016 http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf

Figure 13: Military expenditure by region (US\$ billion 2015)

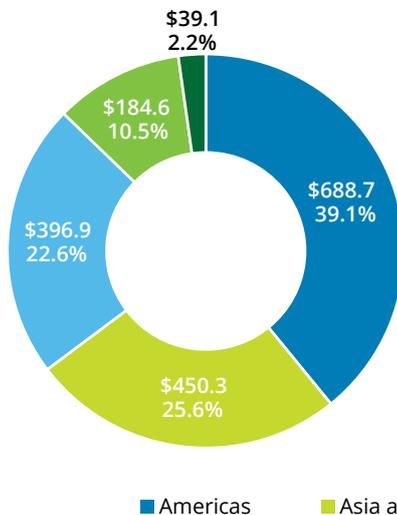
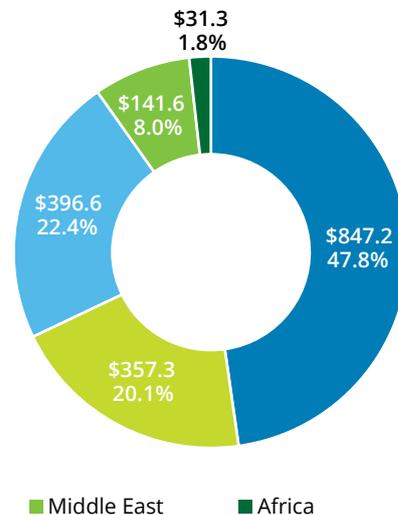


Figure 14: Military expenditure by region (US\$ billion, 2010)



Source: Deloitte analysis based on data from Stockholm International Peace Research Institute (SIPRI) <https://www.sipri.org/databases/milex>

What are the major technological advancements shaping the A&D sector?

The A&D sector has been at the forefront of digital innovations, leading the way for other industries in the adoption of technologies such as additive manufacturing, machine learning, advanced analytics, smart automation, and blockchain among others.

Additive manufacturing (AM): Beyond prototyping, leading A&D companies are now using this technology for manufacturing a range of products, including complex engines parts and wing component to relatively simple yet customized parts such as armrests and food trays. In one example, Lockheed Martin improved the buy-to-fly ratio of the bleed air leak detector (BALD) brackets used in engines from 33:1 to 1:1 by using additive manufacturing over subtractive processes.⁴⁷ Other important product-related benefits of using AM over traditional manufacturing include complex part design capabilities, lower weight, with improved fuel efficiency.⁴⁸ On the supply chain side, AM has helped A&D companies reduce warehouse management and inventory obsolescence costs by manufacturing parts on-demand and reducing the overall time-to-market.

Machine learning and advanced analytics:

By using a set of machine-to-machine (M2M) and machine-to-human (M2H) interfaces, sensors collect information that is fed into analytics solutions to derive insights that drive effective decision making or automated action. In one example, GE Aviation collects real-time data from different systems on its aircraft and runs advanced analytics to identify faults in their engines and maintains them early in the process to minimize maintenance spends and increase parts' lifecycles.⁴⁹ Such predictive models enable airlines to optimize their operations and help GE to sell not just engines, but actual "performance up-time" to help drive higher revenues.⁵⁰

Smart automation and Block-chain:

Aircraft manufacturing is a highly specialized and complex process. An example underlining the importance of this precise manufacturing process is that of the "factory of the future," where Airbus technicians can scan an airplane's metal surface using a tablet or a smart glass and determine the right size of a bolt and the torque required to fix it.⁵¹ Based on the information, a robotic arm completes the task. In addition to automation in the physical

realm, A&D companies are also considering technologies in the digital realm; technologies such as blockchain, originally used in the financial services industry, could help companies improve transparency and automate transactions among supply chain partners spread across the globe.

As A&D companies increasingly deploy one or more of these technologies at various stages in their value chains, they will likely achieve improved operational efficiencies and drive incremental and new revenues for themselves as well as their supply chain partners and customers.

What's the outlook for mergers and acquisition (M&A) activity in 2017 and beyond?

Global M&A deal value in the A&D sector weakened in 2016, after reaching a record level in 2015. The sector recorded M&A deals worth US\$15.6 billion in 2016 (1 January 2016 through 14 November 2016), compared to US\$56.7 billion in 2015, which represents a significant decrease over 2015.⁵² However, the 2015 benchmark was heavily weighted by one transaction where the M&A value was driven largely by Berkshire Hathaway

Inc.'s US\$35.8 billion acquisition of Precision Castparts Corp.⁵³ Similarly, the number of M&A deals fell 20.0 percent to 188 transactions in 2016 (1 January 2016 through 14 November 2016) compared to 235 transactions in 2015.⁵⁴ Uncertainty around the US presidential election and Brexit appeared to have impacted deal-making in the sector.

Nevertheless, the sector continued to experience consolidation, especially in commercial aerospace. Pricing pressures from aircraft OEM's pushed suppliers to gain scale economies by merging and thereby reducing costs. Larger defense primes did not exhibit a similar pressure to consolidate in 2016, as they may have become concerned about antitrust issues and the suggestion of passing legislation to block certain M&A deals by Frank Kendall, the Pentagon's chief weapons buyer.

Notable M&A deals announced in the A&D sector in 2016 include Rockwell Collins Inc.'s US\$6.4 billion offer to purchase B/E Aerospace Inc.⁵⁵ Figure 15 illustrates global M&A volume and deal activity from 2008 to 2016 year-to-date.

In 2017, global M&A activity is expected to recover as the political uncertainty in the United States dissipates. A&D companies will continue to rationalize their product portfolios to match changing customer requirements. In China, the five major defense companies are undergoing restructuring to increase capability advancement.⁵⁶ This restructuring will likely result in divestment of non-core defense assets and consolidation of core assets. However, in Europe, there still remains political ambiguity as some administrative changes continue or are yet to be announced – the recent stepping down of Italian Prime Minister as well as the presidential elections in France and Germany in 2017.

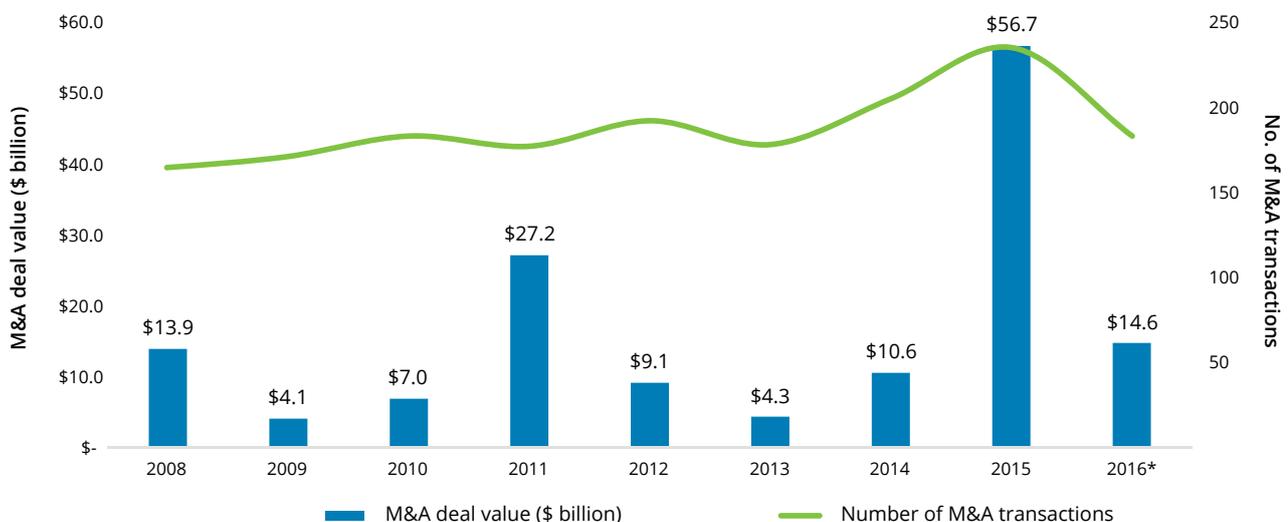
The valuations of A&D companies as a whole are increasing, with the exception of 2015, led by continued improvements in financial performance and growth expectations. Specifically, the price earnings (P/E) ratio of the A&D sector is now 35.2 percent higher than it was five years ago.⁵⁷ Figure 16 illustrates the increase in enterprise value on both an earnings before interest, tax, depreciation, and amortization (EBITDA) and revenue basis.

How did the global A&D sector perform in terms of shareholder return?

Driven primarily by improved profitability, free cash flow, return on invested capital, and future expectations of growth, the key A&D sector indices (including the US based S&P A&D select index and the European STOXX Europe total market A&D index) continued to outperform the broader market. Figure 17 explains the performance of the sector in equity price appreciation compared to these other indices—a 689.0 percent improvement for the S&P A&D select index in the last 16 years, compared to a 42.0 percent improvement for the S&P 500 index.⁵⁸

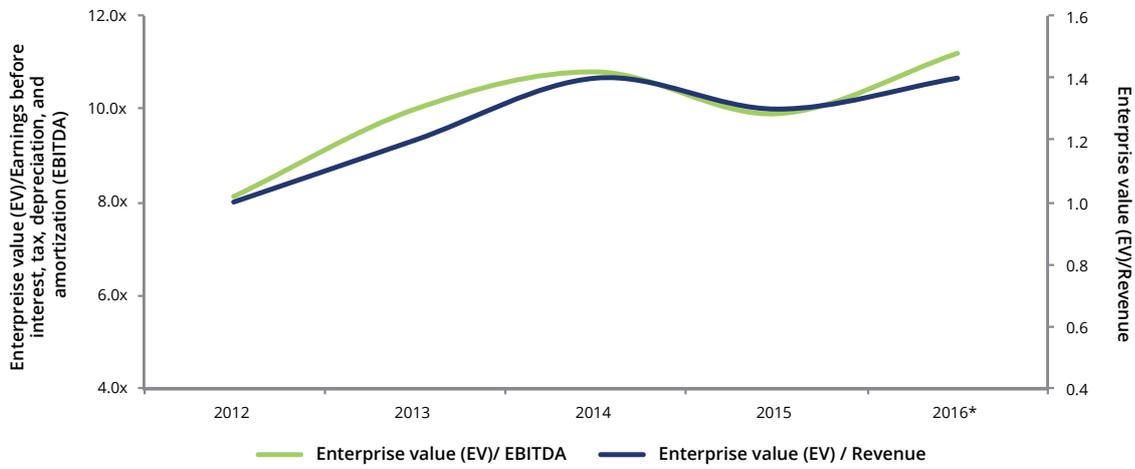
Historically, operating margins for the sector improved from 9.8 percent in 2012 to 10.7 percent in 2013 and 10.8 percent in 2014, but, were marginally down in 2015 at 10.4 percent.⁵⁹ However, over the past several years, A&D sector customers, which includes airlines, passengers, defense departments of individual countries, are likely obtaining more value for their money, creating financial value for shareholders. Figure 18 shows improvement in financial performance since 2011, with increased operating profits as well as operating margins over a five year period.

Figure 15: Global aerospace and defense sector mergers and acquisition activity (2008 to 2016)



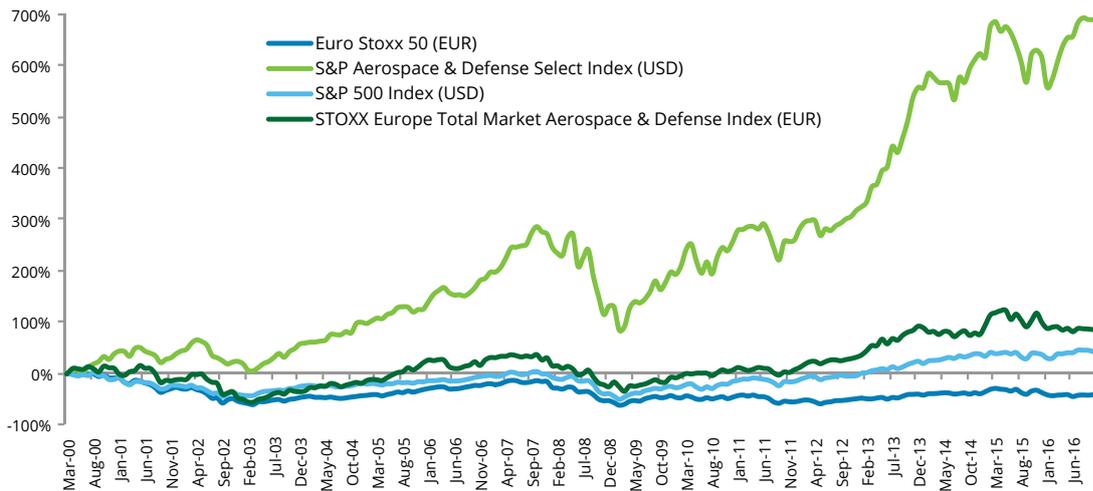
Source: Deloitte analysis of data from Thomson Reuters. Data for 2016 is up to 14 November 2016. The Thomson Reuters Mergers & Acquisitions (M&A) database tracks changes in economic ownership at ultimate parent level in going business concerns. All deals involving a purchase of at least a 5.0% stake, or 3.0% with a value of at least US\$1 million are tracked, subject to criteria. Thomson Reuters gets access to M&A data from publicly available sources such as Reuters Edgar, SEC filing, Dow Jones etc.

Figure 16: Global aerospace and defense sector valuations (2012 to 2016)



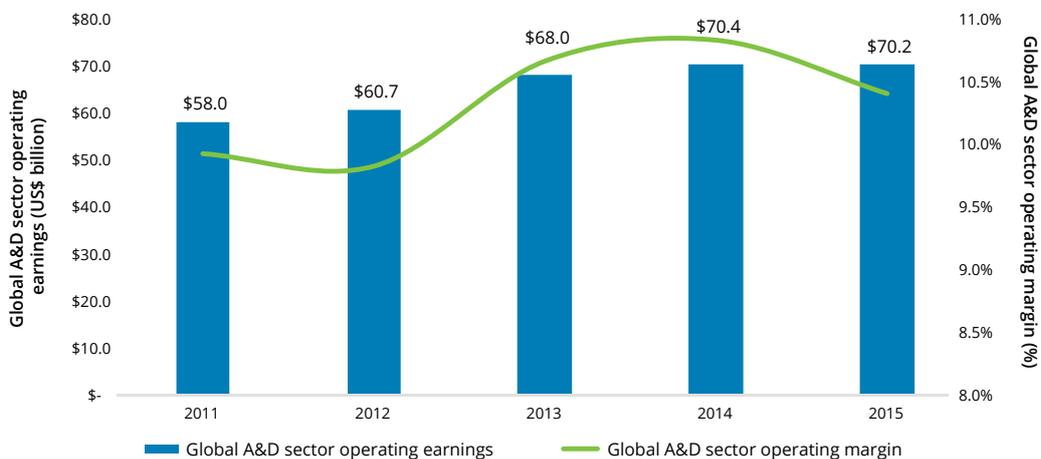
Source: Deloitte analysis of data from Capital IQ, accessed in November 2016

Figure 17: Global aerospace and defense sector indices' performance (2000 to 2016)



Source: Deloitte analysis of data from Bloomberg, accessed in November 2016

Figure 18: Global aerospace and defense sector operating earnings and margin (2010 to 2015)



Source: Deloitte's 2016 Global aerospace and defense sector financial performance study, July 2016

Regional outlook

India

The Indian defense sector saw a lot of activity in 2016 with India's defense budget of US\$50.7 billion for 2016 becoming the fourth largest global defense budget, moving up from the sixth position in 2015. By 2018, India's defense budget is projected to increase to US\$56.5 billion⁶⁰ as the country recapitalizes and strengthens its military to counter potential threats from China and Pakistan, while upgrading existing assets. Further, the government's emphasis on timely execution and improved policy, in consultation with industry participants, is expected to lead to technological advancements in the sector, resulting in increased opportunities for the entry of foreign players.

India signed 15 contracts worth US\$10.5 billion with foreign vendors in 2016⁶¹ (up to October 2016) including contracts for 36 Rafale fighter jets and 145 M777 lightweight Howitzers, and multiple projects have been fast-tracked. For instance, the first of six Scorpene diesel-electric attack submarines was undocked in December 2015 and is undergoing sea trials⁶². Similarly, the first squadron of the indigenously produced LCA Tejas was inducted into the Indian Air Force in July 2016⁶³. The Indian government has also taken multiple policy initiatives including increased international engagement, a revamped FDI policy, and a new defense procurement procedure with key amendments in offset regulations. In the last 2 years, India has signed defense cooperation agreements and MoUs with over 20 countries⁶⁴, entered

the Missile Technology Control regime⁶⁵, and strengthened bilateral relationships with major suppliers. For instance, India signed a military logistics agreement⁶⁶ with the United States and was recognized as a 'major defense partner,' which will enable license-free access to a wide range of dual-use technologies⁶⁷. The Indian government eased foreign direct investment (FDI) norms for the defense sector in June 2016, permitting foreign companies to own 100 percent of domestic ventures with the approval of the government.⁶⁸ Earlier, there was a condition to bring in "state-of-the-art technology" for foreign companies in order to hold greater than 49.0 percent stake in local ventures. However, the government modified this condition to "modern technology or any other reason that may be recorded", relaxing the entry barriers to open up the sector to greater foreign participation and making it more attractive for global defense companies to enter and operate in India. In consultation with industry stakeholders, the Ministry of Defence released a new defence procurement policy in March 2016 to bring clarity to the procurement process. This includes an amended offset policy which addressed key industry concerns such as inclusion of services as a method of discharging offsets and updating Indian Offset Partner to enable complete discharge of obligations.

To benefit from the stronger long-term growth prospects from prior levels, global defense companies have increased their investments into India. There have been various joint-venture announcements in the sector during 2015 to 2016, prior

to the relaxation of FDI norms. Post the relaxation of FDI regulation, the Indian defense sector is likely to record an increase in alliances and partnerships, as well as a rise in foreign companies setting up manufacturing facilities in India.

Major A&D companies such as, Airbus, Boeing, Lockheed Martin, and Safran already have a footprint in the Indian market, with some of them planning further investments. For instance, Airbus announced a joint-venture with Mahindra Defense Systems last year to manufacture helicopters for the Indian military.⁶⁹ Similarly, Boeing entered into a joint-venture with Tata Advanced Systems in December 2015, wherein, they will manufacture fuselages of Apache Helicopters in India. As the sector opens up further, there will be an increase in global defense companies entering the Indian market.⁷⁰

In the commercial aerospace sub-sector, India has the highest traffic RPK growth globally, at 8.6 percent in 2015 and it is expected to be the third largest aviation market by 2026⁷¹. The country is forecast to have a demand for 1,850 new commercial aircraft in the next two decades, the majority being single-aisle planes.⁷² These are expected to support the growth of low-cost carriers that represent more than 60.0 percent of the total flights in India.⁷³

China

China's defense budget is the second largest in 2016, at US\$192.0 billion, up 6.2 percent from 2015.⁷⁴ The country's military expenditure as a percentage of GDP was low as compared to other regions, indicating scope to increase its spending on military. China has a military expenditure to GDP ratio of 1.9 percent, as compared to 2.3 percent for India, 5.4 percent for Russia and 3.3 percent for the US⁷⁵. Moreover, in September 2015, Chinese president, Xi Jinping, announced a reduction in armed forces personnel by 300,000 by the end of 2017 (representing approximately a 13.0 percent reduction).⁷⁶ This may further result in increased spending on military equipment and weapons.

On the commercial aerospace side, China's domestic aviation market is growing fast and is expected to be the world's largest by 2035. The country's passenger travel demand (RPK's) is estimated to surpass North America and Europe by 2035,⁷⁷ with 1.9 trillion revenue passenger kilometers (RPK's) estimated in 2035. This is expected to drive the commercial aerospace sector demand in China, which would require 6,810 aircrafts in the next 20 years to meet the growing travel demand.⁷⁸

The country has also entered commercial aircraft manufacturing to meet domestic as well as global demand for travel. Chinese state-owned aircraft manufacturer, COMAC, plans to produce a 168-seater single-aisle aircraft-C919, which has already received order commitments for 517 aircraft from 21 customers. The company expects the aircraft to have a market potential of nearly US\$100 billion.⁷⁹ More recently, a joint venture between COMAC and UAC in Russia has announced plans to challenge

the existing duopoly in twin aisle aircraft with the new C929 wide body, with a projected entry into service in the next 6 to 10 years.⁸⁰

Also, to boost its A&D sector as well as to encourage foreign investment, China revised its Catalogue of Industries for Guiding Foreign Investment in 2015 to expand the range of approved investment activities of foreign entities into the aviation sector.⁸¹ This will likely enable foreign investors to manufacture small scale aircrafts parts, including aircraft motors and bearings.

The Middle East

During the oil price boom period from 2009 to 2014, spending on commercial aircraft and military equipment by the Middle Eastern countries was on the rise as higher oil prices and strong cash positions enabled countries in the Cooperation Council for the Arab States of the Gulf (known as Gulf Cooperation Council or GCC) to undertake multi-billion dollar defense modernization programs. For example, higher oil prices led defense spending by Saudi Arabia to almost double over the 2009 to 2014 period.⁸² However, after a 20.5 percent rise in 2014, the country recorded only 8.0 percent increase in military expenditure in 2015 to US\$87.2 billion as the year saw a significant decline in oil prices.⁸³ Similarly, the United Arab Emirates (UAE) also reported a strong growth of 64.5 percent in defense expenditure over the 2009 to 2014 period to US\$22.8 billion, when oil prices were high.⁸⁴

However, lower oil prices are likely to affect future defense spending in the Middle East region. The UAE has a more diversified economy and is less dependent on the oil and gas sector. But, Saudi Arabia is highly dependent on the

oil and gas sector, which have accounted for more than 90 percent of government revenues, and is more vulnerable to declining oil prices.⁸⁵

Although the slowdown in defense spending by the Middle Eastern countries is a challenge for A&D companies in the US and Europe, national security threats and ongoing conflict in the region will likely maintain a strong order flow. In 2016, despite low oil prices, UAE's military expenditure is estimated to increase 7.4 percent to US\$23.5 billion. UAE's defense requirements are likely to comprise advanced naval, surveillance, and missile products.⁸⁶ Saudi Arabia was the largest defense importer for the US in 2015, led by its involvements in conflicts in Syria and Yemen, as well as the commencement of delivery of the F-15 fighter aircraft. However, the oil dependent country may be challenged to sustain this levels of military expenditure going forward due to affordability. Nevertheless, Saudi Arabia's defense budget for 2016 experienced only a minor reduction as the Kingdom increases its focus on economic diversification.⁸⁷

For the commercial aerospace sub-sector, the Middle East remains an important market by virtue of its strategic location as a hub linking the major global airline networks. This has resulted in strong travel demand from the region. The Middle East region led travel demand growth globally during the last five years and is expected to continue to record the highest RPK growth in 2016 as well.⁸⁸ Over the next 20 years, passenger traffic growth is forecast to grow strongly at an annual rate of 5.9 percent and the region will need 3,310 aircraft to meet the increasing demand.⁸⁹

United Kingdom (UK)

With the UK exiting the European Union, there is uncertainty around the impact on the A&D sector. The relationships of the UK with other countries, especially the US, coupled with renegotiation of trade agreements, will play a major role in the future challenges and opportunities for the UK's A&D industry. UK defense spending is expected to remain steady with a slight impact on certain defense programs due to regulatory and economic uncertainty. Post the Brexit vote, the pound sterling has depreciated, which, in turn, is expected to boost UK's exports as they become more competitive. Domestic companies have already started eyeing opportunities to sell their military equipment in overseas markets as their products potentially become more price competitive.

UK's defense budget for 2016 at US\$53.5 billion, is almost flat as compared to 2015 levels.⁹⁰ However, it continues to remain the third largest defense budget globally and the country is expected to invest over US\$39.3 billion (£27.7 billion) to reinforce its military forces during 2016 and 2017.⁹¹ The majority of the defense spending by the UK will likely be on surface ships and submarines, land equipment, new precision weapons, such as the Common Anti-Air Modular Missile (CAMM) as well as a new anti-surface guided weapon. Moreover, UK Ministry of Defense (MoD) announced recently an agreement to purchase P-8 maritime patrol aircraft, with the first three units scheduled to be delivered by 2020.⁹²

France

Production in the French aerospace and defense industry is expected to rise by 4.0 percent in 2016, with revenue up 4.5 percent.⁹³ Due to a positive order forecast that will lead to higher production rates, major A&D companies are likely to benefit from this upturn over the coming years. In France and Europe, Airbus, Dassault and their suppliers will sustain this growth, particularly via the production of the A350, A320neo and Rafale aircraft.⁹⁴

The country's 2017 defense budget (excluding pensions) totaled €32.7 billion, an increase of €600 million compared to 2016. This represents 1.77 percent of the French gross domestic product (GDP), compared to 1.78 percent in 2016. The financial trajectory for the military planning law (MPL) has increased in an unstable geopolitical environment and under a high-level terrorist threat in France.⁹⁵ The French government thus wishes to maintain a significant defense effort. On November 2 2016, in parallel to the budget vote, the French Defense Minister, Jean-Yves Le Drian, presented a report to parliamentarians on the military planning law for 2017 to 2019. The report "acknowledges a stop in reductions and the ramp-up of personnel for operational units. Overall, the net balance results in the creation of 782 positions over this period, including 400 in 2017. For the 2017-2019 period, this new trajectory will involve a financial effort of €1.2 billion to fund the defense payroll, equipment, training, etc. and an additional €800 million to meet capacity needs in order to reinforce strike capabilities, secure the territory and acquire supplementary resources for cyber defense and intelligence."⁹⁶ In this context, should the requests be validated, the Ministry of Defense budget would total €35.2 billion in 2019, up by more than €2.0 billion compared to the 2019 budget stipulated in the

"With the UK exiting the European Union, there is uncertainty around the impact on the A&D sector."

2013 military planning law.⁹⁷ The defense effort would thus account for 1.8 percent of GDP (including pensions). France is approaching the 2 percent target for 2020 and most of the increase in funding would be absorbed by personnel additions.

There are several factors that will prove crucial for the French aerospace and defense industry. International air traffic growth represents a major advantage for France, which is also one of the world's major arms exporters. Moreover, rising military expenditure, the trend in the euro/dollar exchange rate, industrial strategy of aircraft manufacturers, significant industrial innovation effort, cost of aircraft produced in France, efficiency of French production means, and government-backed initiatives represent key components in the industry's further development. However, globalized production and foreign competition, namely through relocation, are impeding this expansion, largely because of the pressure on prices driven by aircraft manufacturers.

Major macroeconomic and geo-political trends and their potential impact

Brexit and new US administration

Uncertainty around the nature of Brexit and President-elect Trump's policy directions is likely to impact A&D sector investments in the coming few quarters in the UK and US. While policy direction might become more certain in the US in the coming months based on the appointments President-elect Trump makes to key White House and cabinet positions, uncertainty in the UK is likely to linger for a prolonged time.

In the US, there are indications that the new administration will increase spending on defense and such a boost to spending will likely have a positive impact on sub-sector growth. However, a rise in defense spending is expected to take time, and the resulting orders being placed for new weapons systems may take a few years to be realized.

Rising populist sentiments globally

There appears to be a steady rise in trade protectionism and anti-globalization sentiments across the world. Populists on both sides of the Atlantic have been generally anti-globalization and anti-immigration. The Brexit referendum and Trump's election are perhaps indications that the momentum is gaining strength. The economic impact is already reflected in the decline in the number of M&A deals. According to Thomson Reuters reports, European M&A deals were down 41.0 percent in the second quarter of 2016 to US\$147.3 billion. As the world's biggest M&A market, the US was also down 23.0 percent to US\$421.8 billion⁹⁸. Slowdown in global trade is now in its fifth year with five quarters since fourth quarter of 2014 having registered negative growth in world merchandise exports and imports. The trend that started in 2011 has gained significant momentum since last year.⁹⁹

Currency volatility

US equity indices have been on a steady rise as investors evidently expect that a possible fiscal stimulus will likely boost demand, while a cut in corporate taxes will boost corporate profits. On the other hand, bond yields in developed economies have been rising. Higher yields in the US reflect expectations of higher inflation, owing to fiscal stimulus that will boost demand and employment at a time when the job market is already close to full employment. A higher inflation expectation and increasing yields have resulted in an upward movement of the US dollar, which has been rising against major global currencies, including those from emerging markets. The trend is likely to continue, as the market now expects the US Federal Reserve to tighten monetary policy. This will in turn, likely impact United States' export competitiveness as US A&D exports are likely to become costlier and could experience increased competition from other countries, such as Russia and China for military equipment exports. The UK domestic currency, on the other hand, is depreciating because of economic uncertainty due to the Brexit referendum. This is expected to boost their A&D sector exports due to improved export competitiveness.



What has been the financial performance of the major A&D companies during the first nine months of 2016?

Figure 19 shows that the top 20 global A&D companies reported combined revenues of US\$347.4 billion during the first nine months ending September 2016, representing a year-over-year increase of 1.6 percent.¹⁰⁰ Operating earnings for the top 20 global A&D companies grew by 1.7 percent to US\$33.9 billion during the first nine months of 2016, with almost flat margins.¹⁰¹

On the other hand, the top 20 US based A&D companies' revenues experienced a stronger growth of 2.9 percent to US\$268.8 billion during the same period.¹⁰² However, their operating earnings declined by 7.1 percent to US\$30.8 billion.¹⁰³

As illustrated in Figure 20, aggregate revenues for the top 20 global defense companies reported a 3.3 percent increase to US\$171.6 billion in the nine months ending September 2016, versus US\$166.1 billion during the same period in 2015.¹⁰⁴

The top 20 US based defense companies reported a 5.1 percent growth in revenues during the nine months ending September 2015, hinting towards a recovery in defense spending in 2016.¹⁰⁵

On the contrary, the commercial aerospace sub-sector reported flat revenues for both the top 20 global and the top 20 US companies during the first nine months of 2016 as it experienced a temporary cyclical slowdown in aircraft production.¹⁰⁶

Figure 19: Top 20 global and US aerospace and defense companies' financial performance (2016 and 2015*)

Top 20 global A&D companies	Nine months ending September 2016	Nine months ending September 2015	Percentage change
Revenues (US\$ billion)	\$347.4	\$342.0	1.6%
Operating earnings (US\$ billion)	\$33.9	\$33.3	1.7%
Operating margin	9.8%	9.7%	0.2%
Top 20 US A&D companies	Nine months ending September 2016	Nine months ending September 2015	Percentage change
Revenues (US\$ billion)	\$268.8	\$261.3	2.9%
Operating earnings (US\$ billion)	\$30.8	\$33.1	-7.1%
Operating margin	11.4%	12.7%	-9.7%

* Years include nine months ending September 2016 and September 2015.

Source: Deloitte analysis of the quarterly reports and 10-Q statements for the Top 20 Global and US A&D companies as mentioned in 2016 Global A&D sector financial performance study, July 2016; Top 20 Global A&D companies include Boeing, Airbus, Lockheed Martin, General Dynamics, United Technologies, GE Aviation, Northrop Grumman, Raytheon, Safran, Leonardo Finmeccanica, Thales, Honeywell Aerospace, L-3 Communication, Bombardier Aerospace, Textron, Mitsubishi Heavy Industries Aerospace, Huntington Ingalls Industries, Spirit AeroSystems, Embraer, Rockwell Collins; Top 20 US A&D companies include Boeing, Lockheed Martin, General Dynamics, United Technologies, GE Aviation, Northrop Grumman, Raytheon, Honeywell Aerospace, L-3 Communications, Textron, Huntington Ingalls Industries, Spirit AeroSystems, Rockwell Collins, Alcoa, Harris Corp., Orbital ATK, SAIC, Triumph Group, Leidos Holdings, B/E Aerospace

Note: For Boeing, we used 'Non-GAAP core operating earnings'



Figure 20: Top 20 global and US aerospace and defense companies – Commercial vs. defense sub-sector financial performance (2016 and 2015*)

Revenues (US\$billion)				
		Nine months ending September 2016	Nine months ending September 2015	Percentage change
Top 20 global A&D companies	Commercial aerospace	\$176.1	\$176.0	0.1%
	Defense	\$171.6	\$166.1	3.3%
Top 20 US A&D companies	Commercial aerospace	\$115.2	\$115.0	0.2%
	Defense	\$153.7	\$146.3	5.1%
Operating earnings (US\$billion)				
Top 20 global A&D companies	Commercial aerospace	\$13.9	\$14.5	-3.8%
	Defense	\$20.4	\$19.2	6.1%
Top 20 US A&D companies	Commercial aerospace	\$12.1	\$15.0	-19.3%
	Defense	\$19.1	\$18.5	3.1%

* Years include nine months ending September 2016 and September 2015.

Source: Deloitte analysis of the quarterly reports and 10-Q statements for the Top 20 Global and US A&D companies as mentioned in 2016 Global A&D sector financial performance study, July 2016; Top 20 Global A&D companies include Boeing, Airbus, Lockheed Martin, General Dynamics, United Technologies, GE Aviation, Northrop Grumman, Raytheon, Safran, Leonardo Finmeccanica, Thales, Honeywell Aerospace, L-3 Communication, Bombardier Aerospace, Textron, Mitsubishi Heavy Industries Aerospace, Huntington Ingalls Industries, Spirit AeroSystems, Embraer, Rockwell Collins; Top 20 US A&D companies include Boeing, Lockheed Martin, General Dynamics, United Technologies, GE Aviation, Northrop Grumman, Raytheon, Honeywell Aerospace, L-3 Communications, Textron, Huntington Ingalls Industries, Spirit AeroSystems, Rockwell Collins, Alcoa, Harris Corp., Orbital ATK, SAIC, Triumph Group, Leidos Holdings, B/E Aerospace

Note: For Boeing, we used 'Non-GAAP core operating earnings'

Conclusion

After experiencing a subdued performance in 2016, primarily due to the impact of a decline in commercial aircraft production, the global A&D sector is likely to grow around 2.0 percent in 2017.¹⁰⁷ This forecast takes into account the potential rise in military expenditures, due to increasing global tensions and security threats, instability in the Middle East, as well as higher US DoD budgets. In addition, increase in travel demand, driven by global demographics and wealth creation in Asia and the Middle East, will also contribute to revenue growth.

Major commercial aircraft OEMs continue to hold high order backlogs as demand for new aircraft remains robust. Continued record production levels driven by strong demand for next-generation aircraft and growing passenger traffic are also expected to positively influence commercial aerospace sub-sector growth. Moreover, as the US defense budgets return to growth from 2016 onwards, it is likely that the global defense sub-sector has already seen its near-term bottom.



Endnotes

1. Deloitte analysis based on Median of 2017 analyst estimates of Top 20 pure play A&D companies, accessed from Bloomberg on 29 November 2016; A&D companies include Boeing, Airbus, Lockheed Martin, General Dynamics, BAE Systems, Northrop Grumman, Raytheon, Safran, Leonardo Finmeccanica, Thales, L-3 Communication, Textron, Huntington Ingalls Industries, Spirit AeroSystems, Zodiac Aerospace, Rockwell Collins, Harris Corp., MTU Aero Engines, Dassault Aviation, and Orbital ATK
2. Deloitte analysis of the following data: The Boeing Company, "Order and deliveries," accessed in November, 2016 <http://active.boeing.com/commercial/orders/index.cfm>; Airbus Group, "Orders and deliveries," accessed in November, 2016, <http://www.airbus.com/company/market/orders-deliveries/>; FlightGlobal
3. Deloitte analysis of the following data: The Boeing Company, "Order and deliveries," accessed in November, 2016 <http://active.boeing.com/commercial/orders/index.cfm>; Airbus Group, "Orders and deliveries," accessed in November, 2016, <http://www.airbus.com/company/market/orders-deliveries/>; UBS, US Aerospace and Defense Playbook, 14 October 2016; and Credit Suisse, Global Aerospace and Defense, 27 May 2016
4. Deloitte analysis based on Median of 2017 analyst estimates of Top 20 pure play A&D companies, accessed from Bloomberg on 29 November 2016; A&D companies include Boeing, Airbus, Lockheed Martin, General Dynamics, BAE Systems, Northrop Grumman, Raytheon, Safran, Leonardo Finmeccanica, Thales, L-3 Communication, Textron, Huntington Ingalls Industries, Spirit AeroSystems, Zodiac Aerospace, Rockwell Collins, Harris Corp., MTU Aero Engines, Dassault Aviation, and Orbital ATK
5. The Boeing Company, Commercial Airplanes Fact Sheet, September 2016, <http://investors.boeing.com/investors/fact-sheets/default.aspx>
6. IATA, Industry Statistics, June 2016 http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf
7. The Boeing Company, Current Market Outlook (2016–2035), July 2016, http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/assets/downloads/cmo_print_2016_final.pdf
8. Deloitte analysis of the following data: The Boeing Company, "Order and deliveries," accessed in November, 2016 <http://active.boeing.com/commercial/orders/index.cfm>; Airbus Group, "Orders and deliveries," accessed in November, 2016, <http://www.airbus.com/company/market/orders-deliveries/>; FlightGlobal
9. IATA, Industry Statistics, June 2016 http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf
10. Ibid
11. Deloitte Analysis based on data from IATA, Industry Statistics, June 2016 http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf
12. Deloitte analysis of the following data: The Boeing Company, Current Market Outlook (2016–2035), July 2016, http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/assets/downloads/cmo_print_2016_final.pdf; and Airbus Group, Global Market Forecast (2016–2035), July 2016, <http://www.airbus.com/company/market/forecast/>
13. Deloitte analysis of the following data: The Boeing Company, "Order and deliveries," accessed in November, 2016 <http://active.boeing.com/commercial/orders/index.cfm>; Airbus Group, "Orders and deliveries," accessed in November, 2016, <http://www.airbus.com/company/market/orders-deliveries/>; UBS, US Aerospace and Defense Playbook, 14 October 2016; and Credit Suisse, Global Aerospace and Defense, 27 May 2016
14. Ibid
15. Ibid
16. Deloitte analysis of the following data: The Boeing Company, "Order and deliveries," accessed in November, 2016 <http://active.boeing.com/commercial/orders/index.cfm>; Airbus Group, "Orders and deliveries," accessed in November, 2016, <http://www.airbus.com/company/market/orders-deliveries/>; UBS, US Aerospace and Defense Playbook, 14 October 2016; and Credit Suisse, Global Aerospace and Defense, 27 May 2016
17. BBC, "Boeing set to deliver more planes in 2016", October 2016 <http://www.bbc.com/news/business-37775347>
18. Ibid
19. Reuters, "Airbus to cut A380 assembly rate to one aircraft per month from 2018", 11 October, 2016 <http://www.reuters.com/article/us-airbus-idUSKCN12B0GL>; Bloomberg, "Wide-Bodies' Luster Is Tarnished as American Defers Airbus Jets", 22 July, 2016 <http://www.bloomberg.com/news/articles/2016-07-22/wide-body-s-luster-is-tarnished-as-american-defers-airbus-jets>
20. The Seattle Times, "Boeing cutting output of 777 cash cow, dealing a blow to jobs and revenue", 12 December, 2016 http://www.seattletimes.com/business/boeing-aerospace/boeing-will-cut-777-production-in-everett-next-summer/?utm_source=referral&utm_medium=mobile-app&utm_campaign=ios
21. Reuters, "China-made regional jet set for delivery, but no U.S. certification", 21 October, 2015 <http://www.reuters.com/article/us-china-aircraft-arj21-exclusive-idUSKCN05F2XN20151021>
22. The Telegraph, "Rolls-Royce splashes out £613m on Spanish engine component maker", 11 July 2016 <http://www.telegraph.co.uk/business/2016/07/11/rolls-splashes-out-613m-on-spanish-engine-component-maker/>
23. Deloitte analysis based on Median of 2017 analyst estimates of Top 20 pure play A&D companies, accessed from Bloomberg on 29 November 2016; A&D companies include Boeing, Airbus, Lockheed Martin, General Dynamics, BAE Systems, Northrop Grumman, Raytheon, Safran, Leonardo Finmeccanica, Thales, L-3 Communication, Textron, Huntington Ingalls Industries, Spirit AeroSystems, Zodiac Aerospace, Rockwell Collins, Harris Corp., MTU Aero Engines, Dassault Aviation, and Orbital ATK
24. CNN, "Trump calls for military spending increase", 8 September 2016 <http://edition.cnn.com/2016/09/06/politics/donald-trump-defense-spending-sequester/>
25. Deloitte analysis based on data from the Office of the Under Secretary of Defense (Comptroller) in the United States Budget Request Document, accessed in November 2016, <http://comptroller.defense.gov/>
26. Deloitte analysis of data from Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, accessed in November 2016, http://www.sipri.org/research/armaments/milex/research/armaments/milex/research/armaments/milex/milex_database
27. Ibid
28. CNBC, "Here's the bill for Trump's military buildup plan", 08 September 2016 <http://www.cnbc.com/2016/09/08/heres-the-bill-for-trumps-military-buildup-plan.html>
29. Deloitte analysis of data from Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, accessed in November 2016, http://www.sipri.org/research/armaments/milex/research/armaments/milex/research/armaments/milex/milex_database
30. Defense Security Cooperation Agency, "Fiscal Year 2016 Sales Total \$33.6B", 8 November 2016 <http://www.dsca.mil/news-media/news-archive/fiscal-year-2016-sales-total-336b>
31. Investor's Business Daily, "U.S. Arms Sales Overseas Are On Record Pace With Big Mideast Sales", 09 December 2016 <http://www.investors.com/news/u-s-arms-sales-overseas-on-track-to-break-record-with-apache-chinook-approvals/>
32. The New York Times, "E.U. Plans Big Increase in Military Spending", 30 November 2016 http://www.nytimes.com/2016/11/30/world/europe/eu-plans-big-increase-in-military-spending.html?_r=0
33. Japan Today, "Japan's defense budget for FY 2017 likely to hit record", 02 December 2016 <https://www.japantoday.com/category/politics/view/japans-defense-budget-for-fy-2017-likely-to-hit-record-y5-1-tr1>
34. Boeing, "Boeing, TATA Joint Venture Establishes Aerospace Facility in Hyderabad", 18 June, 2016 <http://www.boeing.co.in/news-and-media-room/news-releases/2016/june/boeing-tata-joint-venture-establishes-aerospace-facility.page>
35. IHS Jane's 360, "UMEX 2016: Al Marakeb partners with Raytheon for USV development", 08 March 2016 <http://www.janes.com/article/58637/umex-2016-al-marakeb-partners-with-raytheon-for-usv-development>
36. The Wall Street Journal, "Ex-Im Bank Faces New Hurdle as Senator Blocks Board Nominees", April 2016 <http://www.wsj.com/articles/ex-im-bank-faces-new-hurdle-in-congress-over-board-nominees-1461835801>
37. The Wall Street Journal, "Ex-Im Bank Critics, Supporters Look to Donald Trump for Help", December 2016 <http://www.wsj.com/articles/ex-im-bank-critics-supporters-look-to-donald-trump-for-help-1481228004>
38. Deloitte analysis of information from DTTL's annual Global A&D sector financial performance study for the years 2011, 2012, 2013, 2014, 2015, and 2016, Deloitte estimates.
39. Ibid
40. Ibid
41. Ibid
42. Ibid
43. Ibid
44. Deloitte analysis based on data from Stockholm International Peace Research Institute (SIPRI) <https://www.sipri.org/databases/milex>
45. Ibid
46. Ibid
47. Ryan Dehoff, Chad Duty, et al., "Additive manufacturing of aerospace brackets," Advanced Materials & Processes, March 2013.
48. Mark Cotteleer, Jonathan Holdowsky, Monica Mahto, and John Coykendall, 3D opportunity for aerospace and defense: Additive manufacturing takes flight, Deloitte University Press, 2014.

49. Business Insider, "Why every flight you take is obsessively monitored", 16 June 2015, <http://www.businessinsider.com/airplanes-and-big-data-sensors-2015-6>
50. Ibid
51. Airbus, "Factory of the future: New ways of manufacturing", <http://www.airbusgroup.com/int/en/story-overview/factory-of-the-future.html>, accessed 9 November 2016.
52. Deloitte analysis of data from Thomson Reuters M&A database, 2016 data is through 14 November 2016.
53. Ibid
54. Ibid
55. Ibid
56. IHS Jane's 360, "Chinese defence companies sign restructuring deals", 07 September 2016 <http://www.janes.com/article/63490/chinese-defence-companies-sign-restructuring-deals>
57. Deloitte analysis of data from Capital IQ, accessed in November 2016.
58. Deloitte analysis of data from Bloomberg, accessed in November 2016.
59. Deloitte analysis of information from DTTL's annual Global A&D sector financial performance study for the years 2011, 2012, 2013, 2014, 2015, and 2016, Deloitte estimates.
60. Deloitte analysis based on data from IHS Jane's, 12 December 2016 <http://news.ihsmarket.com/press-release/2016s-15-trillion-global-defence-spend-kick-decade-growth-ihs-market-says>
61. India Defence News, "India Signed 15 Defense Contracts Worth \$10.5 Billion This Year", November, 2016 <http://www.indiandefensenews.in/2016/11/india-signed-15-defense-contracts-worth.html>
62. The Indian Express, "INS Kalvari sea trials begin today: All you need to know about the attack submarine", December, 2015 <http://indianexpress.com/article/explained/ins-kalvari-sea-trials-begin-today-all-you-need-to-know-about-the-attack-submarine/>
63. The Economic Times, "First squadron of LCA Tejas inducted into Indian Air Force: 8 things to know", July, 2016 <http://economictimes.indiatimes.com/news/defence/first-squadron-of-lca-tejas-inducted-into-indian-air-force-8-things-to-know/articleshow/53001820.cms>
64. Transforming India: Key Accomplishments in the defence sector under the Narendra Modi Govt, Ministry of Defence, Govt of India, July 2016
65. The Hindu, "India joins Missile Technology Control Regime. Top 5 things to know", June, 2016 <http://www.thehindu.com/news/national/india-to-become-full-member-of-mtcr-today/article8778729.ece>
66. Reuters, "U.S., India sign military logistics agreement", August, 2016 <http://www.reuters.com/article/us-india-usa-military-idUSKCN114241>
67. Daily O, "Thanks to Modi, a new symphony in India-US defence partnership", June, 2016 <http://www.dailyo.in/politics/narendra-modi-in-america-barack-obama-nuclear-suppliers-group-china/story/1/11115.html>
68. The Hindu, "100% FDI in defence: What does it mean?", June 2016 <http://www.thehindu.com/news/national/100-FDI-in-defence-What-does-it-mean/article14433877.ece>
69. The Economic Times, "Airbus Helicopters signs contract with Mahindra to make parts of Panther helicopters", 13 July 2016 <http://economictimes.indiatimes.com/news/defence/airbus-helicopters-signs-contract-with-mahindra-to-make-parts-of-panther-helicopters/articleshow/53177244.cms>
70. Boeing, "Boeing, TATA Joint Venture Establishes Aerospace Facility in Hyderabad", 18 June, 2016 <http://www.boeing.co.in/news-and-media-room/news-releases/2016/june/boeing-tata-joint-venture-establishes-aerospace-facility.page>
71. Boeing, "Boeing Forecasts Demand for 1,850 New Airplanes in India", 20 July 2016 <http://www.boeing.co.in/news-and-media-room/news-releases/2016/july/boeing-forecasts-demand-for-1850-new-airplanes-in-india.page>; Economic Times, "India to become 3rd largest aviation market by 2026: IATA", 18 October 2016 <http://economictimes.indiatimes.com/industry/transportation/airlines/-aviation/india-to-become-3rd-largest-aviation-market-by-2026-iata/articleshow/54919114.cms>
72. Ibid
73. Ibid
74. Deloitte analysis based on data from IHS Jane's, 12 December 2016 <http://news.ihsmarket.com/press-release/2016s-15-trillion-global-defence-spend-kick-decade-growth-ihs-market-says>
75. Deloitte analysis based on data from Stockholm International Peace Research Institute (SIPRI) <https://www.sipri.org/databases/milex>
76. UBS, "China Aerospace & Defense: Riding the modernization of the PLA", July 2016
77. Bloomberg, "Long Haul for China's Big Jet", 3 November 2016 <https://www.bloomberg.com/gadfly/articles/2016-11-03/a-runway-to-the-horizon-for-china-s-big-plane>
78. Bloomberg, "Xi's Dream Takes Shape in Shanghai to Challenge Airbus, Boeing", 30 October 2016 <http://www.bloomberg.com/news/articles/2016-10-30/chinese-planemaker-chases-xi-s-dream-to-challenge-airbus-boeing>
79. Ibid
80. AINonline, "UAC and Comac Form Joint Venture for New Widebody", 07 November 2016 <http://www.ainonline.com/aviation-news/air-transport/2016-11-07/uac-and-comac-form-joint-venture-new-widebody>
81. Invest in China, Catalogue for the Guidance of Foreign Investment Industries (Amended in 2015) http://www.fdi.gov.cn/1800000121_39_4830_0_7.html
82. Deloitte analysis based on data from Stockholm International Peace Research Institute (SIPRI) <https://www.sipri.org/databases/milex>
83. Ibid
84. Ibid
85. International Trade Administration, 2016 Defense Markets Report: Middle East http://trade.gov/topmarkets/pdf/Defense_Middle_East.pdf
86. Ibid
87. Ibid
88. Deloitte analysis based on data from IATA, Industry Statistics, June 2016 http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-industry-facts.pdf
89. Boeing, "Boeing Commercial Airplanes in the Middle East", <http://www.boeing-me.com/en/boeing-in-the-middle-east/about-boeing-in-the-middle-east/boeing-commercial-overview.page>
90. Deloitte analysis based on data from IHS Jane's, 12 December 2016 <http://news.ihsmarket.com/press-release/2016s-15-trillion-global-defence-spend-kick-decade-growth-ihs-market-says>
91. International Trade Administration, 2016 Defense Markets Report: Western Europe http://trade.gov/topmarkets/pdf/Defense_Western_Europe.pdf
92. International Trade Administration, 2016 Defense markets Report, Western Europe http://trade.gov/topmarkets/pdf/Defense_Western_Europe.pdf
93. 2016 forecasts in July. L'industrie aéronautique et spatiale, Laurent Faibis, Publishing Director, Xerfi France, July 2016, p. 6-10
94. Ibid
95. La Tribune, "Budget 2017: les sept inquiétudes du chef d'état-major des armées", October 2016 <http://www.latribune.fr/entreprises-finance/industrie/aeronautique-defense/budget-2017-les-sept-inquietudes-du-chef-d-etat-major-des-armees-610486.html>
96. Le Drian présente un rapport relatif à la programmation militaire 2017-2019, Guillaume Belan, <http://www.air-cosmos.com/le-drian-presente-un-rapport-relatif-a-la-programmation-militaire-2017-2019-84825>
97. Law of December 18, 2013 (no. 2013-1168) relating to military planning for 2014 to 2019. <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFT-EXT000028338825&categorieLien=id>. This law was updated on July 28, 2015 (no. 2015-917) following the January 2015 terrorist attacks against Charlie Hebdo magazine in Paris so as to reinforce national defense and secure the anti-terrorist capacity of French forces. This law is an update of the military planning law for 2015-2019. <https://www.legifrance.gouv.fr/eli/loi/2015/7/28/DEFX1510920L/jo/texte>
98. Reuters, "Global M&A declines in second quarter as mega deals seen too risky", 1 July 2016 <http://in.reuters.com/article/us-global-m-a-analysis-idINKCN0ZF2YG>
99. Ibid
100. Deloitte analysis of the companies' quarterly reports and 10-Q statements for the companies mentioned in the DTTL study 2015 global A&D sector financial performance study
101. Ibid
102. Ibid
103. Ibid
104. Ibid
105. Ibid
106. Ibid
107. Deloitte analysis based on Median of 2017 analyst estimates of Top 20 pure play A&D companies, accessed from Bloomberg on 29 November 2016; Major A&D companies include Boeing, Airbus, Lockheed Martin, General Dynamics, BAE Systems, Northrop Grumman, Raytheon, Safran, Leonardo Finmeccanica, Thales, L-3 Communication, Textron, Huntington Ingalls Industries, Spirit AeroSystems, Zodiac Aerospace, Rockwell Collins, Harris Corp., MTU Aero Engines, Dassault Aviation, and Orbital ATK

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