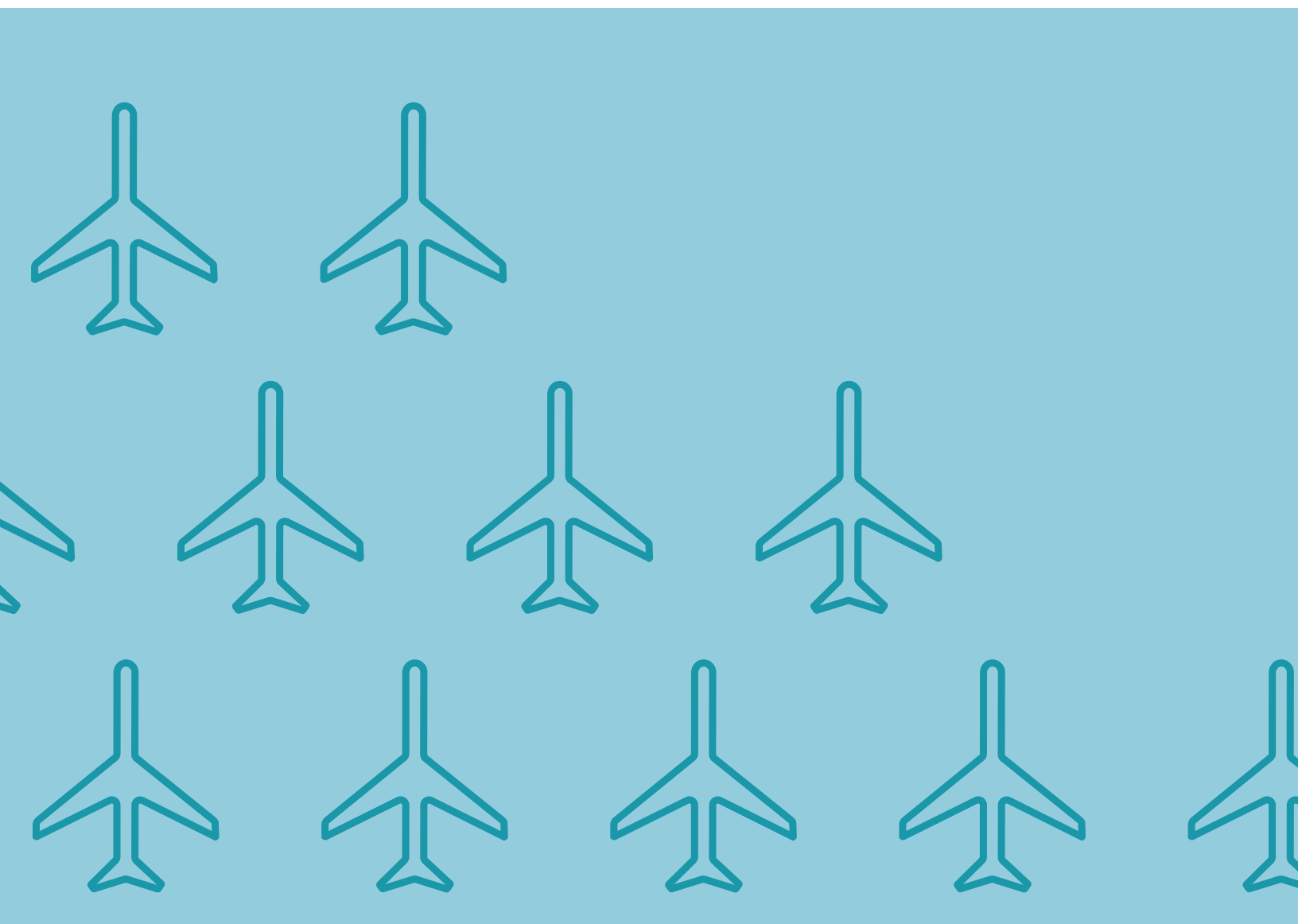


OCTOBER 2016

Aerospace, Defense & Aviation Outlook: Civil aviation profit soars, but aerospace and defense faces many challenges



At A Glance

1

A largely favorable market boosts profits

- Industry margins remain near all-time highs.
- Positive macroeconomic factors include a strong dollar and low oil prices.
- Cost controls in all segments are now paying dividends.
- Performance varied notably among the industry's various sectors.

2

Civil aviation soars, but aerospace faces challenges

- Airline profits have soared, due to growing traffic and low oil prices.
- Growth among Asian carriers is leveling off, while Gulf carriers remain strong.
- Commercial OEMs are struggling to work their way through record backlogs.
- Net aircraft orders dropped in 2015, but overall risk for the sector is limited.

3

Global defense spending is at an inflection point

- Spending increased for the first time since 2011.
- Western nations continued to reduce spending, though new threats may lead to an upturn.
- Growth continues to shift to developing markets.
- The space market faces increased disruption from new entrants.

Most macroeconomic factors, including oil prices and the US dollar, are boosting the aerospace and defense (A&D) industry, and overall profits remain high. Yet the performance of specific segments is decidedly mixed. Commercial airlines are thriving, OEMs are seeing net orders decline, and defense players face slower growth.

A LARGELY FAVORABLE MARKET BOOSTS PROFITS

The global aerospace and defense (A&D) industry continued posting record-level profits during 2015, with earnings-before-interest-and-taxes (EBIT) margins of more than 10%, which was near an all-time high. Several macroeconomic conditions continued remaining favorable during this year—particularly the stronger US dollar and historically low oil prices that are benefiting airlines. However, market conditions vary widely across sectors, with the oil & gas segment collapse hurting helicopters.

CIVIL AVIATION SOARS, BUT AEROSPACE FACES CHALLENGES

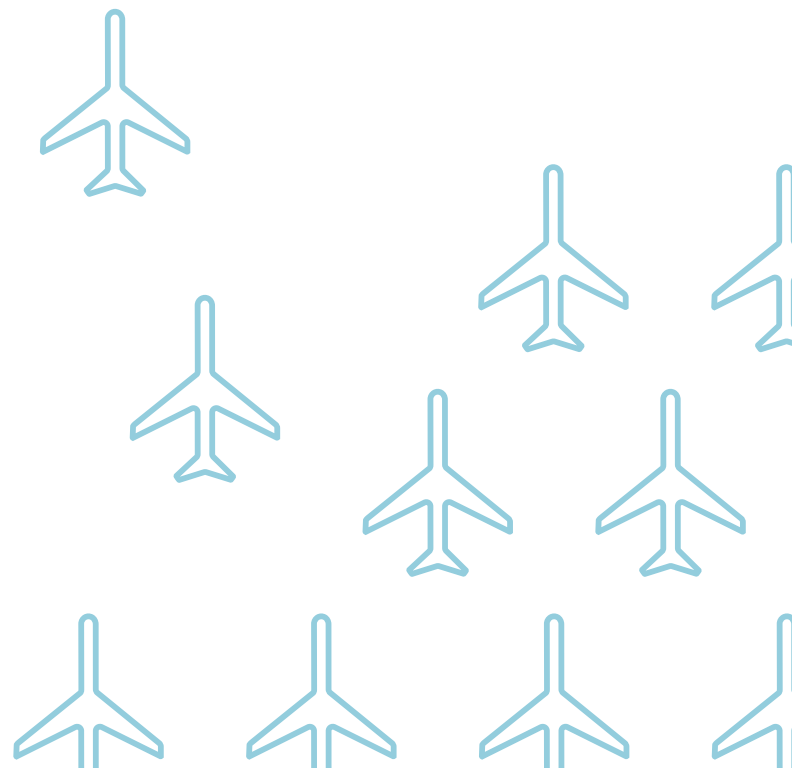
Airline profits are soaring, thanks to cheap oil as global traffic grows. And carriers in the United States—the profit leaders, with 15% average EBIT—benefit from a consolidated market, cost-cutting measures, and healthy levels of traffic. But ticket prices are down significantly—11% compared with last year—as carriers keep adding capacity and as cost reductions get passed along to customers. In addition, aircraft original equipment manufacturers OEMs are struggling to meet demand. In 2015, their *order backlogs* reached a record high of more than 13,000 orders—probably enough for more than seven years of production even with planned production increases—but *net orders* actually declined in 2015. Some suppliers are struggling to meet demand, and overall profits for the aerospace industry declined by 11%.

GLOBAL DEFENSE SPENDING IS AT AN INFLECTION POINT

Global defense spending experienced a slight uptick, to \$1.77 trillion, but is still slightly off the 2011 peak. The share of global spending by NATO countries has

been steadily declining, though emerging threats from Ukraine, ISIS, and cyberspace could lead to expanding budgets again. On the flip side, several developing countries that had been heavily increasing their defense spending—including Saudi Arabia, China, and Russia—are slowing down in a context of budget constraints caused by lower oil and commodity prices. In that context, defense prime contractors were still able to increase their profit margins to 11% in 2015, thanks mainly to cost cutting.

For contractors, the biggest challenges are (1) a shift in demand from their historical, domestic clients to export business in the Middle East and Asia and (2) their ability to offer affordable products and quickly available battlefield solutions for those markets.



The global aerospace and defense (A&D) industry continued to benefit from favorable market conditions in 2015, according to AlixPartners' most recent annual A&D Outlook. The top 100 A&D companies posted a 3% increase in sales, and they sustained strong profit margins (measured by earnings before interest and taxes, or EBIT) of 10.1%—which hovered at all-time highs for the industry.

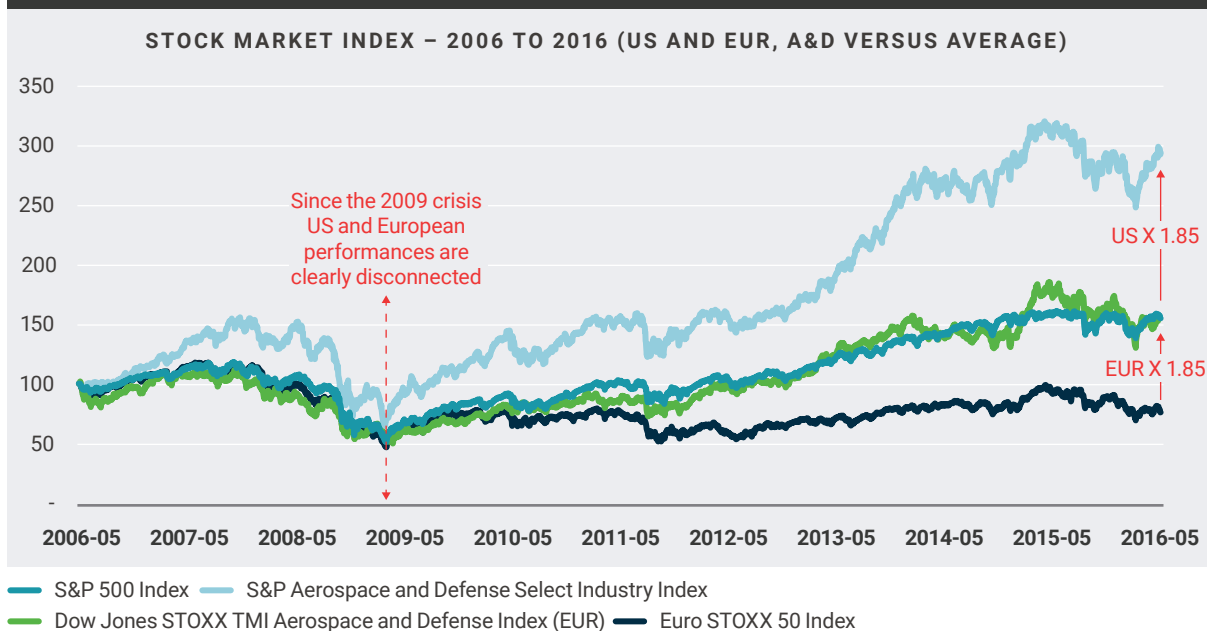
Overall, cost controls put in place across all segments during the most recent correction are now paying dividends by letting companies ride favorable tailwinds and create value for shareholders. Since the financial crisis in 2009, the industry continues to outperform the overall stock market—by a factor of almost two (figure 1).

Yet performance varied notably from one to the other of the industry's various sectors. Strong growth in some sectors and challenges in others reflect a kind of economic wind shear wherein adjacent markets do not benefit evenly from the same underlying factors. For example, *commercial airlines have soared*, posting record aggregate profits of \$60 billion and EBIT margins of 8.4%, thereby tripling their margins since 2012. The sector has been returning its cost of capital. However, the profit pool for the *commercial aerospace segment declined* 11% in 2015, to \$34 billion, as some suppliers struggled to work their way through record backlogs and as original equipment manufacturers (OEMs) also suffered from program execution issues.

Global defense spending increased 1% in 2015, to \$1.77 trillion, and even though it remains lower than its 2011 peak, it may be at an inflection point. NATO countries and their allies are indeed still reluctant to increase military spending—given fiscal constraints—but recent threats such as (1) terror attacks in Europe, (2) tensions in eastern Europe's Ukraine, in the Middle East, and in North Asia's North Korea and the South China Sea, and (3) cybersecurity issues could lead to bigger budgets in 2016 and beyond. On the flip side, defense spending grew at only 6 to 7% by China, Russia, and Saudi Arabia—down from the more-than-40% increases of several years ago caused by budget constraints in a context of low oil prices and an economic slowdown in China. Nonetheless, the top global defense primes increased EBIT margins to 11% on essentially flat revenue in 2015 and focused on returning money to their shareholders by buying back shares and distributing dividends.

M&A significantly increased in 2015 with \$75 billion in closed deals vs \$41 billion in 2014. Valuations remain high, at more than 10 times EBITDA, though multiples varied widely across segments (figure 2). The most notable transaction in 2015 was Berkshire Hathaway's acquisition of Precision Castparts Corp. for \$37 billion, illustrating Warren Buffett's strong confidence in the aerospace industry.

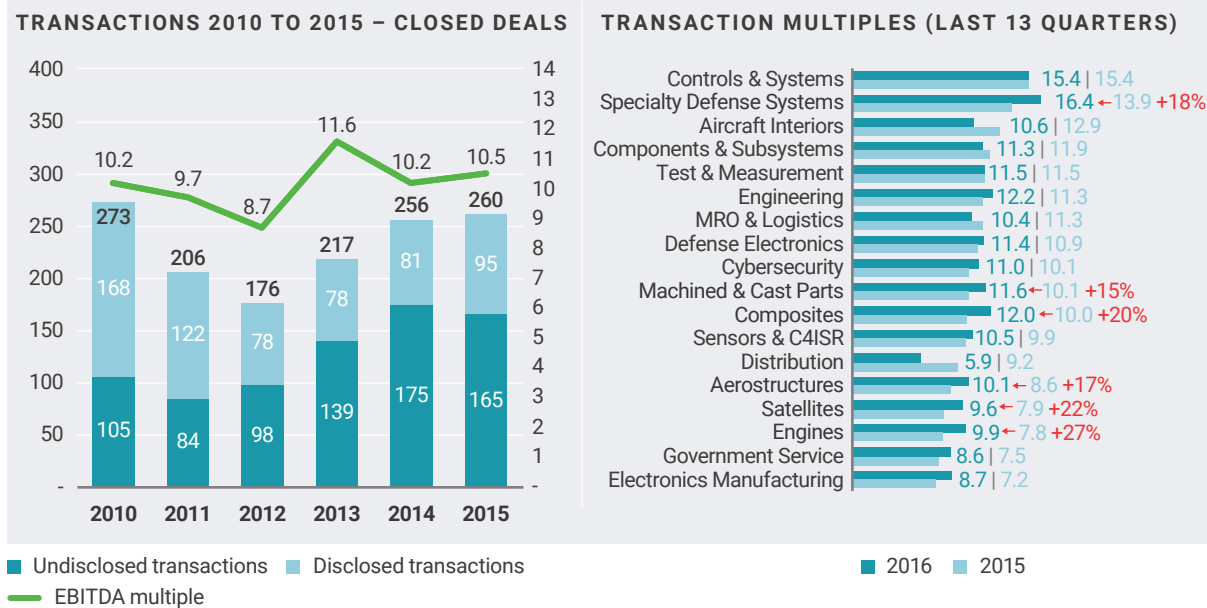
FIGURE 1: A&D equities performance



Source: Standard & Poor's, Dow Jones, AlixPartners analysis

¹ AlixPartners, 2016 *Global Aerospace and Defense Industry Outlook*. The *Outlook* is an annual update on the state of the industry and is the latest thinking on trends that may shape the coming year. All references, facts, and opinions contained in this article can be found in the 2016 *Outlook*.

FIGURE 2: Aerospace and defense M&A activity



Source: S&P Capital IQ, Janes Capital Partners, AlixPartners analysis

Overall, many current macroeconomic drivers are currently creating tailwinds for the industry. GDP growth is slow but steady, leading to healthy passenger traffic; and oil prices remain far below historical averages, which reduces airlines’ fuel costs. Commodity prices continue falling as well, and the US dollar has gained strength. Record low interest rates in most of the Western economies mean lower capital costs for all borrowers—including government lessors—and are clear enablers for M&A activity. But: those ideal market conditions will probably not last. The industry has to get ready in the event that the currently aligned planets disengage.

The following pages discuss how the overarching trends have affected specific A&D sectors.

IN CIVIL AVIATION, PROFITS SOAR BECAUSE OF CHEAP OIL

The civil aviation sector—made up of airlines, lessors, aircraft OEMs, and their suppliers—saw total profits soar in 2015, to \$94 billion. The bulk of that growth came from airlines, which posted \$60 billion in profits—triple the amount from 2012 (figure 3). In contrast, aircraft OEMs and their suppliers saw profits decline 11% in 2015, to \$34 billion, as suppliers and OEMs struggled to deliver their record backlogs and as some of them posted one-off charges.

Airlines experienced declining revenue—down 4% in 2015, to \$718 billion; driven by an 11% decline in yields; and despite an increase in passengers—because ticket prices decreased with lower fuel surcharges and strong competition globally. Yet carriers still managed to post strong margins, with EBIT margins increasing from 4.7% in 2014 to 8.3% in 2015.

In large part, airlines benefited from dramatically lower fuel prices while traffic increased 7.4%. Oil prices fell more than 50% from 2012 to 2015. Even factoring in hedging delays and currency effects—the fuel-cost drop in US dollars offset by a decline in reporting currency versus the US dollar—airlines still reported a net drop of 32% in fuel costs since 2012. The cost controls that many carriers put in place during the postcorrection period also served to boost profits: nonfuel operating costs have declined 11% since 2012. And in the European market in particular, network carriers have reduced nonfuel costs significantly in the past seven years—primarily through staff cuts and reductions to other ancillary expenses (though they still lag the cost position of low-cost carriers because legacy costs and restructuring efforts are facing strong resistance).

Regionally, North American carriers posted the highest EBIT margins (15%)—up from 3% in 2012. The United States is now very concentrated, with the top

four players controlling 80% of the market. A strong economic recovery has also led to greater demand and higher revenue passenger kilometers.

Persian Gulf carriers continue to post strong growth rates and now constitute 10% of global passenger traffic. Their backlogs, particularly of wide-body aircraft, show their strong growth ambitions. With regard to the long-haul fleet and orders for the top three carriers in the United States, Europe, and the Gulf, US and European carriers together *operate* 70% of the sampled fleet but *represent* only 40% of the backlog. On the contrary, Gulf carriers operate 31% of today's sampled long-haul fleet, but they account for 60% of the order backlog. Among Gulf carriers, Etihad has the largest backlog (twice the size of its current fleet). Emirates has the largest fleet, with 240 wide-bodies, but its backlog is bigger than that. As Gulf carriers move forward with planned disposals of aircraft, US and European carriers might have an opportunity to acquire secondhand long-haul aircraft. (It's still difficult to assess Gulf carriers' financial performance. Emirates has a record of profitable growth—with a dominant Airbus A380—but Qatar and Etihad have disclosed much less information thus far. But that could change as part of the US–Gulf Open Skies debate.)

In Asia, airlines' operating profits reached 8% in 2015, up from 2.5% in 2014. Asian carriers have significantly increased capacity through low-cost carriers, and overall profitability will likely remain flat.

Moving forward, airlines' strong profits could enable the carriers to expand capacity, upgrade fleets and cabins, put together strategic M&A deals, and return some value to shareholders. Traffic is expected to double in the next 15 years, driven by long-term GDP growth. That will cause additional pressure in at least 15 saturated big-city airports. For instance, because Heathrow cannot get support for new runways, the A380 is now operated on 38 flight routes from London.

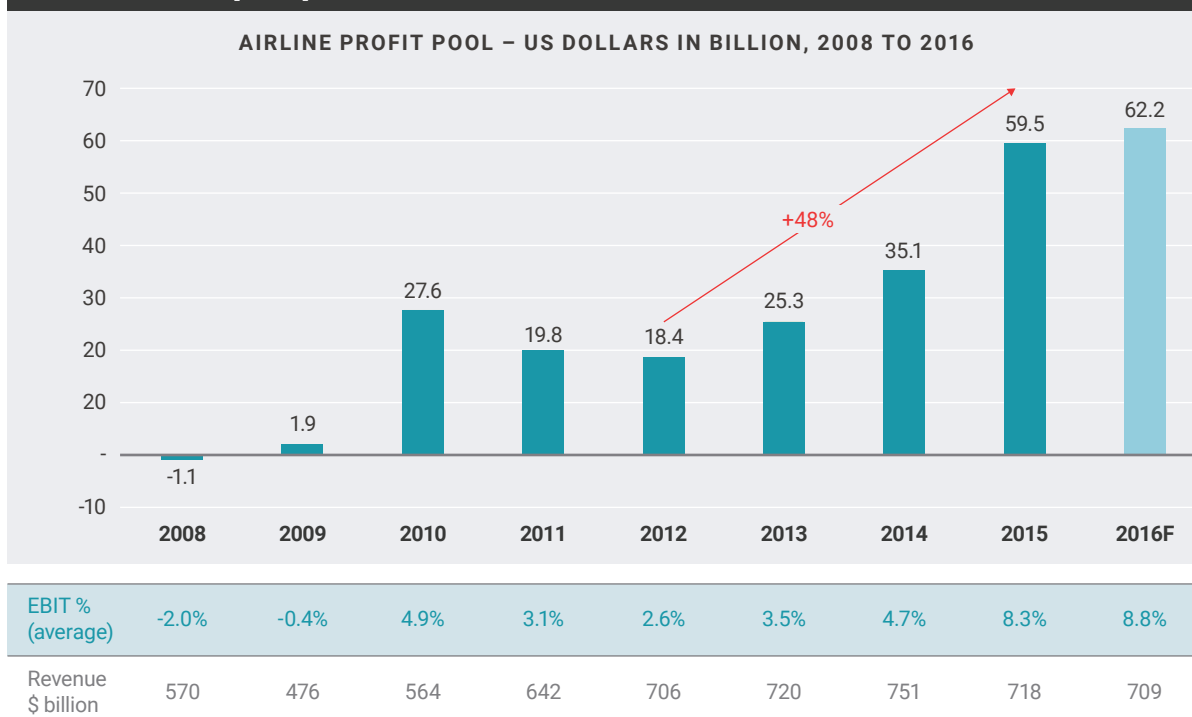
In addition, continued consolidation is likely. Although improved financials—even for weaker airlines in Europe and Asia—will enable some of them to remain independent, price competition will likely erode the windfall profits they experienced in 2015. We anticipate that in the next 12 to 24 months, some carriers will experience financial distress, leading to further consolidations in both Asia and Europe.

CIVIL AEROSPACE HAS RECORD BACKLOGS—AND CLEAR GROWING PAINS

The civil aerospace sector consists of aircraft and aircraft parts manufacturers; engine and engine parts manufacturers; aviation service providers in maintenance, repair, and overhaul (MRO); and aircraft lessors. The overall profit pool for the sector declined 11% from 2014 to 2015 to \$34 billion (figure 4).

For aircraft OEMs, the biggest challenge lies in meeting demand, and clearly, priority is on program execution.

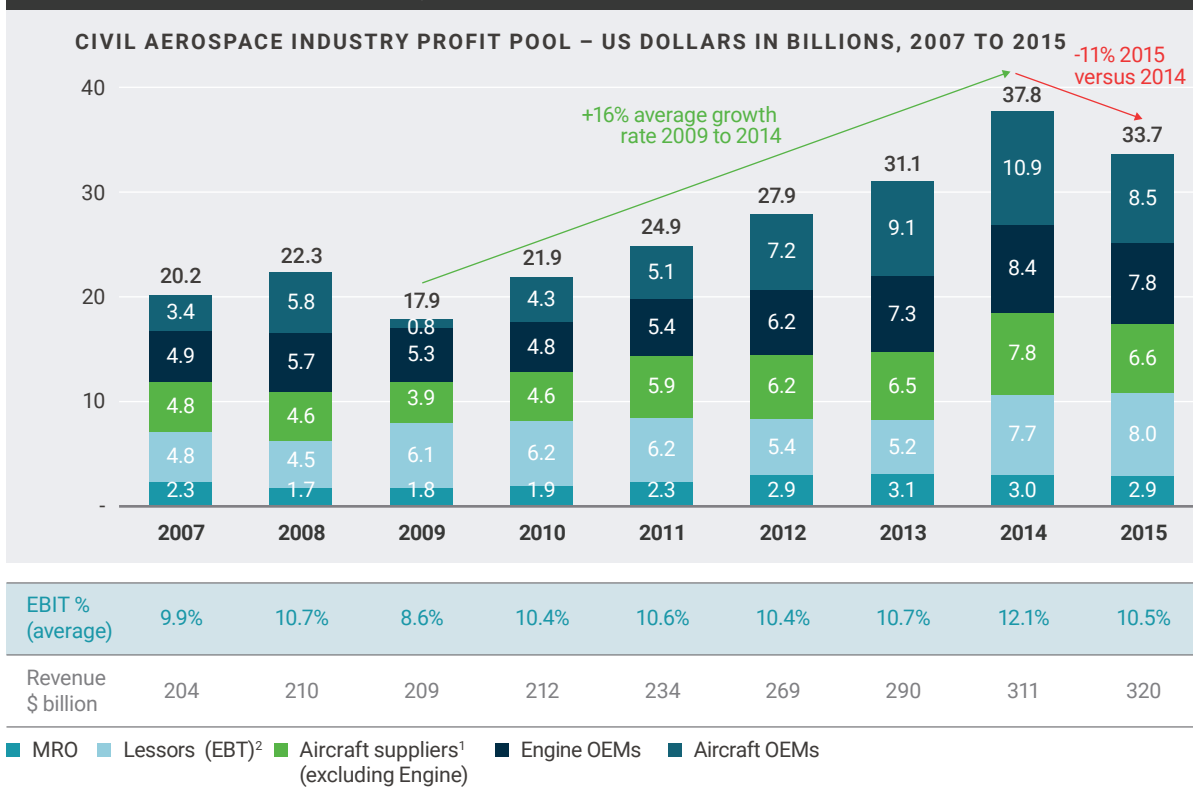
FIGURE 3: Airline profit pool



Source: AlixPartners analysis, IATA, ICAO

Note: Yield: revenue per passenger (passenger) and revenue per ton (cargo)

FIGURE 4: Civil aerospace industry profit pool



Source: AlixPartners analysis on company annual reports 2007 to 2014, ICF, CPMIL

Notes: (1) Aircraft suppliers including Equipment, Material, Aerostructure and Cabin suppliers.

(2) Considered EBT for Lessors (Earning before Taxes), instead of EBIT, as interest rate is relevant as cost.

(3) Bombardier exceptional one-off charges at \$4.7 billion in 2015 (\$3.2 billion for C-Series, \$1.2 billion for business jet Learjet 85).

(4) Revenues of non US companies transformed in US\$ at average spot rate (unless for Airbus, where hedging rate is partly used). Profit pool based on average EBIT% per segment; Engine OEMs/Suppliers and Equipment OEMs including their business for MRO/Aftersales ; MRO excluding OEM related business ; Material suppliers including raw material, castings, forgings.

The backlog for commercial aircraft reached a new record by the end of 2015, at 13,400 jets (mostly because of orders for Airbus A320neo and Boeing 737 MAX jetliners). That represents 10.1 years of production for narrow-body planes and 6.7 years for wide-bodies at current rates. OEMs appear to be ramping up their production rates, which will help but not entirely solve the problem. (Even at increased production, order backlogs will drop only to 7.6 years for narrow-body airframes and 5.7 for wide-bodies.)

Narrow-body aircraft deliveries are projected to grow the fastest. By 2019, Airbus is expected to deliver 60 A320-family jets a month (up from 40 in 2015), and Boeing should be increasing production of the 737 to 57 a month by 2019 (up from 42 in 2017). In addition, new models such as Bombardier's C Series and Comac's C919 are seeing orders, though both models experienced significant delays and will not be major components of airline fleets before 2020.

Among wide-bodies, the A350 ramp-up will increase deliveries to 12 per month by 2019. Rates of both the A330 and the 777 will decline temporarily as Airbus and Boeing transition to the A330neo and 777X, respectively.

A central challenge in this ramp-up comes from the supply chain. Selected suppliers are facing significant difficulties in supporting OEMs as the latter scales up production—particularly engine manufacturers and cabin suppliers.

Net aircraft orders dropped 35% in 2015, leading some to question the strength of the order backlog and whether OEMs are wise to scale up production so aggressively. Some of the risk comes from emerging Asian airlines, which appear to have ambitious growth plans. Several airlines in Southeast Asia and India placed orders for more than 200 aircraft but face financial difficulties based on strong drops in their local currencies as well as

price competition in the region. Some 20% of the current backlog for narrow-body aircraft comes from those carriers. In addition, some carriers in established markets might be taking advantage of low fuel prices to delay upgrades to more-efficient airframes. The huge backlog will likely see some attrition, but the overall risk for the sector is limited. Cancellations are currently about 10 to 12% of gross orders, which is in line with historical averages.

Longer term, industry orders are projected at 32,500 new jets over the next 20 years. The global passenger fleet is expected to almost double in size during that period due to growth in passenger traffic (4.7% a year on average) and an increase in seat capacity, as carriers switch to larger airframes. Some 40% of that growth will take place at Asia Pacific carriers, whose fleets will be as large as those of Europe and North America combined by 2034.

Helicopter manufacturers have been hit hard by the drop in oil prices, given their exposure to oil & gas services operators. And a slowdown in military demand has compounded the challenge. New helicopter deliveries fell by 28% from 2013 to 2015: to fewer than 1,700 units (lower than the total for 2011). Revenue for the top five helicopter OEMs declined by 13% in the same time period, to \$25 billion. The sales decline and impact on profitability have led to strong restructuring efforts, such as CHC Group's Chapter 11 filing and

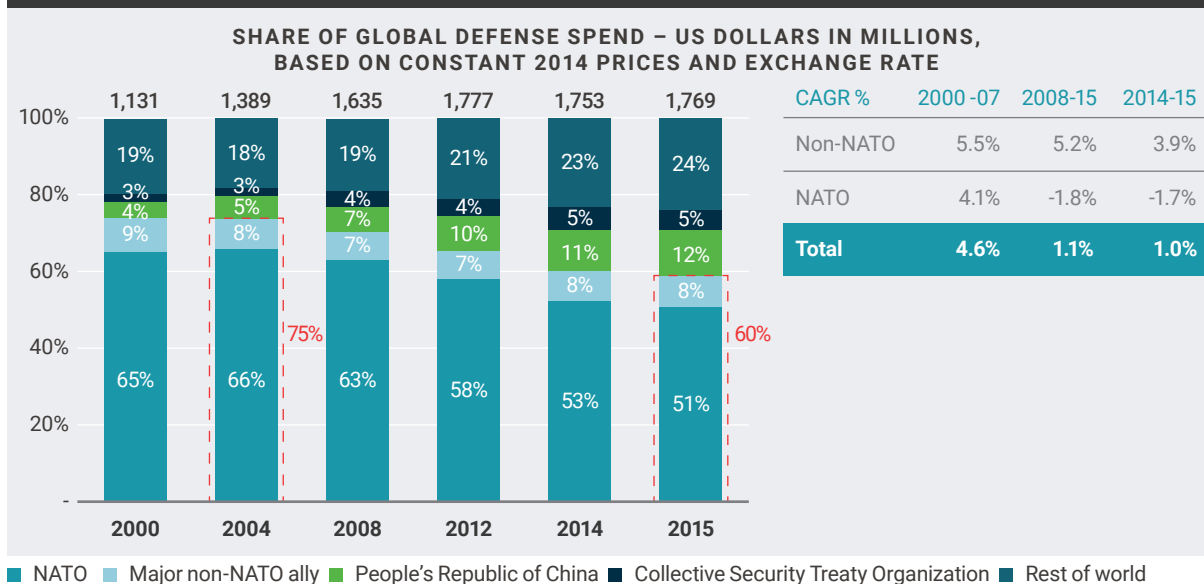
some consolidation, as illustrated by Lockheed Martin's landmark acquisition of Sikorsky for \$9 billion. In that context, some manufacturers are relying more on MRO, which typically represents 40 to 60% of profits for a helicopter OEM and is projected to grow at a compound annual rate of 3.9% through 2020. We expect further restructuring in this sector as OEMs adapt their cost structures to decreased top-line revenue.

DEFENSE PROFITS GROW, BUT SPENDING IS FLAT

After several years of declines, defense budgets are at a possible inflection point, posting their first increase since 2011. Global defense spending grew a marginal 1% in 2015, to \$1.77 trillion, which was slightly below the sector's peak in 2011. Average EBIT margins for defense prime contractors increased to 11% on cost cuts, and revenue declined for most of them.

The bigger development in defense spending is likely to involve a continued shift from Western countries to developing markets. Spending by NATO nations fell slightly in 2015, continuing a recent trend (figure 5). In the past 12 years, the share of global defense spending by NATO countries and their allies declined from 75 to 60%; and all countries in the group are below 2011 spending levels. The United States remains the top spender overall, representing one-third of the total. There is a sense that Western countries' spending could finally begin to grow again because of emerging

FIGURE 5: Share of global defense spending



Source: Stockholm International Peace Research Institute database, Wikipedia, AlixPartners analysis

security threats such as the terror attacks in Europe, cyberthreats, and the persistence of non-nation-based threats from such entities as ISIS.

In contrast to developed-markets buyers, several developing countries continue to spend heavily on defense. For instance, Russia, China, and Saudi Arabia all spent 6 to 7% more in 2015 than in 2014. However, these increases represent a significant slowdown compared to the 40 to 60% cumulative increases in the last four years ago. Moreover, there's a chance all three will continue to ease back further. Both Russia and Saudi Arabia are constrained by low oil prices, and the economic slowdown in China may cause fiscal pressure as well. The result of the shifts is that defense prime contractors are adjusting their portfolios to prioritize growing segments that are less affected by domestic budget cuts and are pushing into international markets.

Among specific players, the five major US defense primes (Boeing, General Dynamics, Lockheed Martin, Northrop Grumman, and Raytheon) posted similar financial performance: 11 to 13% EBIT margins and declining growth rates of minus 3% to 0%. The only US contractor with flat revenues in 2015, Lockheed Martin, could grow significantly with the current Sikorsky acquisition.

European competitors faced greater contractions. BAE Systems, the only player comparable in size to US primes, saw revenue declining by 3% yearly on average (in compound annual growth rate, or CAGR) during the past five years due to high exposure to land systems. Airbus Defence and Space is restructuring its portfolio, and the company sold its defense electronics business to KKR for €1 billion (scheduled to close in 2016). Leonardo saw a greater revenue decline than other European competitors (minus 4% CAGR) but significantly improved margins, thanks to its restructuring plan.

SPACE MARKET IS UNDERGOING INCREASED DISRUPTION FROM NEW ENTRANTS

The global space market of \$203 billion grew by 4% in 2015. Both the satellite and launcher segments are vulnerable to significant disruption from new market entrants but face different intrinsic challenges and priorities.

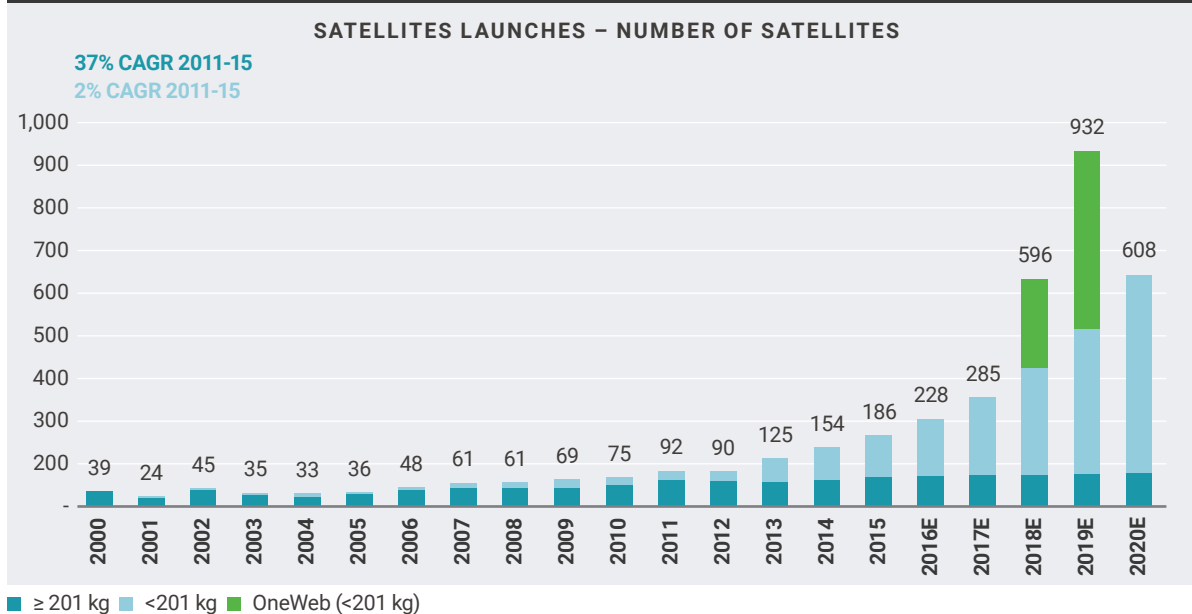
SATELLITES

Some 60% of the space segment consists of satellite services, with another 29% in ground equipment. The number of rocket orbital launches dipped slightly in 2015, to 86 (including four manned launches), which is down slightly from 92 (four manned) in 2014. A structural trend in the satellite sector is a fast rise in smaller satellites and constellations (figure 6), enabled by lower-cost launches such as SpaceX and smaller overall launchers. The trend is likely to increase access to space and make such operations more flexible. Small satellites, microsats, and nanosats generally provide strong functionality and capabilities and at much lower costs than traditional satellites. That in turn creates new services: providing Internet access in remote areas where the required investment of several hundred million dollars to put a geostationary communications satellite in orbit would not make economic sense. The new environment requires corresponding changes to OEMs' strategies, production, and development.

On the technology front, recent changing customer demands and competitive pressures are spurring new requirements in the satellite market in the areas of electrical propulsion, remote refiguring, and on-orbit servicing to maintain new constellations and extend the lives of existing satellites. In addition, the shift to constellations will require that satellite manufacturers adopt standardized processes so they can meet more-stringent schedule and cost targets and achieve higher production volumes. More-affordable, small satellites and the commoditization of sensor data will also fundamentally change the prevailing mind-set in the industry. Rather than the established approach of big rockets and heavy satellites, instead agility, speed, and cost competitiveness will become paramount.

Those shifts will likely trigger continued consolidations and strategic partnerships as companies scramble to make the investments required to build up needed capabilities. A good example is SES's recent takeover of O3b Networks for \$730 million in equity and \$300 million to repay debt.

FIGURE 6: Satellite launches through 2020



Source: Satellite Industry Association, Tauri Group, SpaceWorks survey, Federal Aviation Administration, OneWeb

LAUNCHERS ARE POSING A THREAT

Legacy operators in the launcher segment face a huge threat from so-called new-space upstart players such as SpaceX and Blue Origin. SpaceX's success in the commercial market—at much lower costs—and its access to the US military market—worth \$70 billion through 2030—is rewriting the rule book. Several other countries, too, want to gain or maintain independent access to space through commercial launchers so they can amortize their investments and ensure launcher reliability.

That shift will force incumbent players to dramatically revamp their business models to become faster, leaner, and less expensive. One notable step in that direction comes from the Airbus Safran team currently designing the Ariane 6, which is intended to compete with commercial launchers—at half the lead time and half the development costs of earlier systems. ULA has similar measures under way. However, this is a long-term evolution in which cost pressures will continue to grow through technological breakthroughs, and established players will have to make more-radical changes during the coming decade if they are to remain competitive.

CONCLUSION

The overall A&D industry posted near-record profit margins in 2015, thanks to healthy production volumes in commercial aircraft, low oil prices, and cost-cutting in the defense sector. But the market is not uniformly positive: a kind of economic wind shear is affecting the industry, in which adjacent segments can experience dramatically different financial performances from one another. Airlines are indeed reaping the benefits of low oil prices and strong traffic, but price competition is raging, so most of the cost reductions are passed on to passengers. Aerospace OEMs are struggling somewhat in program execution yet still face good growth prospects, thanks to their record backlogs. Helicopter OEMs face the most difficult market environment because they're collateral victims of low oil prices. Defense contractors are seeing relatively flat revenues and have to fight for growth by way of M&A or aggressive export tactics. Last, space companies are vulnerable to disruption from new entrants and are responding with consolidations and aggressive cost reduction efforts.

We believe that 2017 will no doubt be another strong year for the A&D industry, with clear opportunities for players that take steps to become more competitive. **A**

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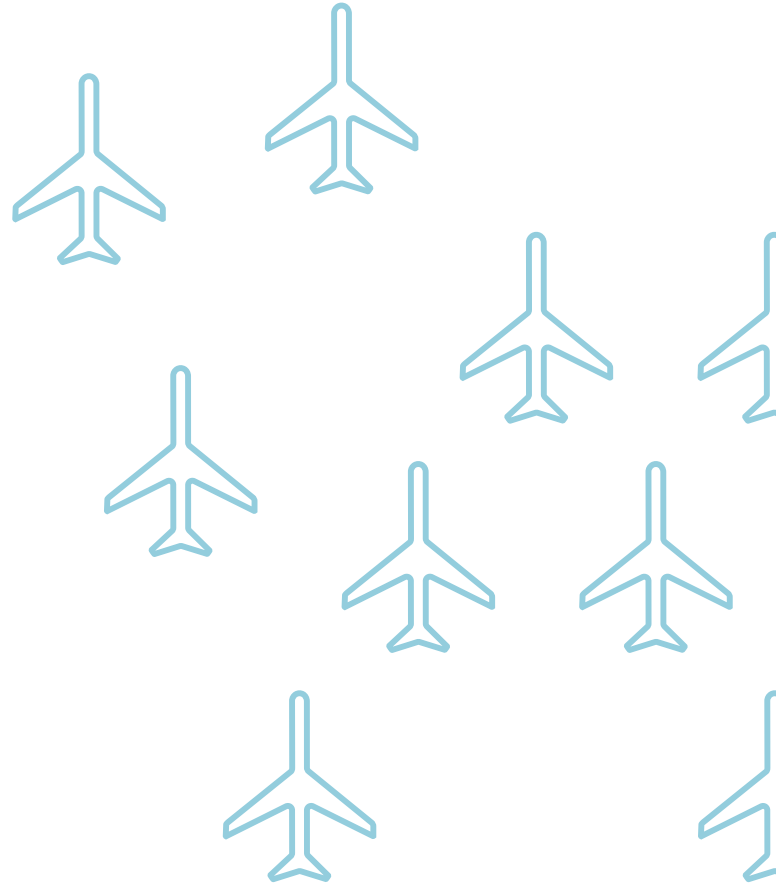
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