Trade wars, 737 MAX grounding and deteriorating economic conditions result in 2019 slowdown. We expect the overall 2019 commercial aerospace market to grow at 2.5% annual growth rate year-on-year (YoY) which, compared with 2018, shows a slowdown. This is primarily due to the impact of the 737 MAX grounding on airline operations and Boeing’s deferred 737 MAX shipments.

Airbus delivered 389 jets in 1H19, increasing 28% YoY, which was significantly higher than Boeing’s delivery of 239 jets, a 37% YoY decline. The 2019 North America commercial aerospace market is expected to slightly decline by 0.4%, whereas Europe is expected to witness significant growth at 6.1% YoY primarily due to a strong first half of 2019 driven by a strong revenue passenger kilometer (RPK) growth rate of 5.7% YoY.1 However, the threat of a ‘no-deal’ Brexit looms large on UK suppliers, who may see increased tariffs on their sales across Europe if there is no trade agreement. The Asia Pacific region will continue to exhibit slower growth of 5.1% in 2019 compared to 2018 amid the continuing weak economic environment in China but is expected to recover by 2020.

Middle East aerospace demand is expected to be up 6.8% YoY driven by strong air traffic. The Latin America market is expected to witness a robust 9.9% YoY growth in 2019 driven by a strong 1H19 due to the proliferation and success of low-cost carriers in the region.

WARNING SIGNS
Amid an expansionary period for airlines, there have been warning signs that capacity growth has outstripped demand. Today, there are fresh signs that key players are preparing for an eventual downturn, indicating vulnerabilities in their business outlook. Airline industry margins continue to decline, driven by various factors such as rising labor and infrastructure costs. According to the International Air Transport Association (IATA), global airline industry EBIT margins have declined from a peak of 8.6% in 2015 to a projected margin of 5.0% in 2019.2

Macroeconomic risk factors are top of mind for aerospace executives, with worsening economic conditions and interest rate changes the key near-term areas of concern. The effect of a no-deal Brexit looms large from both a supply chain and regulatory perspective. Several UK aerospace companies are seeking to be regulated under the jurisdiction of other EU authorities in order to be able to sell new components or parts to European customers in the event of Brexit without a trade agreement.

Trade wars and retaliatory tariffs continue to have the potential to broadly drive costs up for raw materials, sub-systems and parts. The ongoing trade war could potentially derail Boeing’s discussions for a 100 twin-aisle jet mega deal with Chinese airlines.
On the other side of the world, the Boeing-Airbus WTO dispute over aircraft subsidies has resulted in both the US and EU announcing retaliatory tariffs. All these factors could lead to a reduction in book-to-bill in 2019 for both Airbus and Boeing. Book-to-bill for both OEMs declined in 2018 versus prior years and, given the weaker economic climate, especially in China, could be even lower in 2019. Both OEMs are shipping from multi-year backlogs, so lower book-to-bill ratios will not immediately impact new aircraft deliveries. However, customer deliveries remain an ongoing industry challenge for a variety of technical and regulatory reasons, as OEMs are struggling to meet their delivery targets on some of their commercial aircraft programs.

**PRODUCTION RATES**

While future production rate increases remain a challenge for suppliers, the recent production cut for 737 announced by Boeing is expected to provide some short-term relief for suppliers providing fuselages, engines and wing parts for the 737 MAX. Suppliers will be faced with the challenge of balancing their production operations in preparation for higher OEM production rates and short-term inventories.

On a positive note, tax reforms by the Trump administration have provided both short-term and long-term benefits for US aerospace companies, enabling them to make additional capital investments to ramp up production. These companies are investing in their people, increasing dividends and evaluating the repatriation of stranded profits. The lower US corporate tax rate has enabled companies to repatriate cash to fund the expansion of production capacity and/or invest in research and development activities, as well as funding mergers and acquisitions.

Capacity expansion will continue to put pressure on costs and drive additional investments in efficiency, production automation, cost visibility, and supplier development. The significant backlogs are allowing the commercial aerospace industry to ride through the current aircraft order volatility. The 737 MAX grounding has had a mixed impact on MRO providers. 737 MAX maintenance has been severely curtailed, but aircraft due to retire are being kept in service with corresponding maintenance needs.

**MRO**

Lower aircraft retirement levels and additional shop visits for older aircraft will provide opportunities for MRO providers with open maintenance slots. For the time being, however, older aircraft (10+ years) make up more than 50% of the global commercial fleet and require ongoing maintenance. The fleet of older aircraft that continues to fly may also delay OEMs’ ability to differentiate with proprietary service offerings targeted at newer platforms.

Overall, Accenture’s analysis, together with the results from our aerospace executive poll, support the case for a continued rise in 2019 air traffic growth. This, combined with the large fleets of older aircraft, will fuel the MRO market over the next 18 months.

**SUSTAINABILITY**

Environmental sustainability has become an important issue over the past few years and is now a top priority for the aviation industry. Capabilities such as smart flight planning and electric taxi are emerging to help reduce the aviation industry’s environmental impact. Along with their huge aircraft orders for Boeing and Airbus, airlines have a growing interest in hybrid and electric aircraft concepts. 53% of aerospace and defense executives cite electric or hybrid propulsion as their top choice for technology that will deliver reduced CO₂ emissions or fuel efficiency improvements for aircraft operators in the next 10 years.
GLOBAL OUTLOOK

Slowdown in 2019, however 2020 builds upon higher growth rates across regions

Ongoing trade wars, the 737 MAX grounding and worsening economic conditions are expected to result in a slowdown in 2019 compared to recent years. The aftermarket continues to be healthy, driven mainly by traffic growth and older fleets continuing to fly. North America will be the primary driver for slowdown in global commercial aerospace growth, declining 0.4% YoY as a result of 737 MAX grounding, negating growth in other segments and airline operations. The Chinese economic slowdown is a drag on growth in the Asia Pacific region. The 2019 forecast shows that the Latin America market is witnessing the highest commercial aerospace industry growth rate globally, at 9.9% YoY, followed by 6.8% YoY in the Middle East. While the largest growth area in terms of magnitude, percentage growth in the Asia Pacific market is expected to slow down to 5.1% YoY in 2019 as a result of a general manufacturing slowdown in China amid a weakening economic environment. (Figure 1 and Figure 2)

Figure 1. Global Commercial Aerospace Index (USD, 2015 = 100)
For 2019, we expect declining quarterly YoY growth rates in the second half, reflecting a continued slowdown in narrow-body commercial aerospace production. The second half of 2019 will see slow YoY growth of 1.4%, whereas growth in 2020 is expected to increase to 8.4% YoY reflecting strong growth due to full-rate 737 MAX production as well as expected increased production rates for the A320 and 737 lines. Overall, we expect commercial aerospace demand to increase 2.5% YoY globally in 2019. This growth is being driven by increases in Europe which are taking up some of the slack from the growth slowdown in North America and Asia Pacific regions, with supporting strong growth rates in the Middle East and Latin America.
PRODUCTION CAPACITY OUTLOOK

Intelligently keeping up with rate increases

While paused in 2019 due to 737 MAX production rate reductions, narrow-body aircraft production expansion will resume driving unit volume growth in 2020, presuming a 2019 737 MAX return to service. This capacity increase will allow OEMs to start making a dent in their significant aircraft backlogs. The grounding of the 737 MAX has provided some slack to the supply chain—which had been reeling under the pressure from OEM production rate increases—in the near term. Suppliers see this as an opportunity to prepare for higher production rates once the 737 MAX returns to service.

50% of executives expect their production capacity to remain the same over the next 12 months. However, more than 70% expect an increase in their production capacity by end of 2020.

As the entire value chain ramps up, production input costs are certainly important, but we are also seeing rapid change in how those inputs are transformed into final products, as well as efforts to maximize capacity utilization. Production capacity increases are driving demand for solutions aimed at bringing innovation into existing manufacturing processes as well as additional capacity investments.

Production Capacity Outlook
(Percent of executives surveyed)

<table>
<thead>
<tr>
<th></th>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
</tr>
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<tbody>
<tr>
<td>Decrease</td>
<td>16%</td>
<td>50%</td>
<td>19%</td>
</tr>
<tr>
<td>Maintain</td>
<td>47%</td>
<td>50%</td>
<td>9%</td>
</tr>
<tr>
<td>Increase</td>
<td>37%</td>
<td></td>
<td>72%</td>
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<table>
<thead>
<tr>
<th></th>
<th>Next 6 months</th>
<th>Next 12 months</th>
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<tbody>
<tr>
<td>Decrease</td>
<td>16%</td>
<td>50%</td>
<td>19%</td>
</tr>
<tr>
<td>Maintain</td>
<td>47%</td>
<td>50%</td>
<td>9%</td>
</tr>
<tr>
<td>Increase</td>
<td>37%</td>
<td></td>
<td>72%</td>
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</tbody>
</table>
SUPPLIER DELIVERY OUTLOOK

Need for an Agile Supply Chain

While the supply chain will ultimately meet OEM demands, many suppliers continue to face challenges from the sustained increases in the production rate. For example, the decision of Airbus to increase its production rate for the A320 family aircraft to 63 per month by 2021 is likely to be a huge concern for engine manufacturers who are already facing technical challenges. Continued capacity expansion is exerting pressure on costs and driving the search for additional efficiency, production automation, cost visibility, and supplier development investments.

Among all business functions, supply chain and logistics is emerging as the top innovation priority for aerospace and defense companies. According to our survey, digital practitioners in the aerospace supply chain can successfully scale 60% of their digital pilot projects.3 While the future production rate increases remain a concern for suppliers, the recent 737 MAX production rate cut announced by Boeing is also expected to impact the suppliers providing fuselages, engines and wing parts. Due to the grounding of Boeing’s 737 MAX, some of the suppliers are reconsidering their decisions about whether to continue their production as per their earlier planned rates, as their inventories are increasing and the timeline for resolution of 737 MAX issues remains unclear.

Supplier Delivery Outlook

(Percent of executives surveyed)

<table>
<thead>
<tr>
<th></th>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not meet</td>
<td>13%</td>
<td>78%</td>
<td>16%</td>
</tr>
<tr>
<td>Meet</td>
<td>56%</td>
<td>22%</td>
<td>31%</td>
</tr>
<tr>
<td>Exceed</td>
<td>31%</td>
<td>53%</td>
<td>53%</td>
</tr>
</tbody>
</table>
The market for highly-skilled workers, whether in manufacturing or design, will remain highly competitive, with competition for talent coming from other industries such as high-tech. At the same time, driving innovation and culture change across the myriad functions in the typical aerospace company remains a top challenge for aerospace company leadership. According to our research, 96% of aerospace and defense executives plan to invest in equipping their workforce to leverage digital tools and machine capabilities to improve productivity and enhance their culture of experimentation.4

### Raw Materials Cost Outlook
(Percent of executives surveyed)

<table>
<thead>
<tr>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease</td>
<td>Maintain</td>
<td>Increase</td>
</tr>
<tr>
<td>12% 66% 22%</td>
<td>9% 38% 53%</td>
<td>12% 16% 72%</td>
</tr>
</tbody>
</table>

### Sub-System or Parts Cost Outlook
(Percent of executives surveyed)

<table>
<thead>
<tr>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease</td>
<td>Maintain</td>
<td>Increase</td>
</tr>
<tr>
<td>9% 53% 36%</td>
<td>16% 56% 28%</td>
<td>13% 28% 59%</td>
</tr>
</tbody>
</table>

### Production Labor Cost Outlook
(Percent of executives surveyed)

<table>
<thead>
<tr>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
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</thead>
<tbody>
<tr>
<td>Decrease</td>
<td>Maintain</td>
<td>Increase</td>
</tr>
<tr>
<td>22% 50% 28%</td>
<td>22% 37% 41%</td>
<td>19% 28% 53%</td>
</tr>
</tbody>
</table>
BUSINESS CYCLE STANCE

Slowdown in 2019

We do not expect a dramatic increase in new aircraft orders over the next 18 months. The main drivers of market growth are a very strong MRO market and delivery of current backlogs. OEMs are increasingly focused on aftermarket services, and they are shifting towards new business models and alternative revenue streams as economic downturns and cycles impact aircraft sales. 87% of aerospace and defense executives plan to invest in transformation to as-a-Service business models.

Respondents generally see increased revenues over the next 12 to 18 months but do not expect any increase in the next six months. The 737 MAX grounding has not only affected Boeing revenues but is also expected to have an impact on key suppliers to the program. This has resulted in an estimated 2.5% YoY increase in global commercial aerospace revenues in 2019, a decline over the 4.2% growth seen in 2018. More than 50% of aerospace and defense respondents expect their commercial aerospace revenues to remain the same over the next six months.

Business Cycle Stance (Commercial Aerospace Revenues) Outlook

(Percent of executives surveyed)

<table>
<thead>
<tr>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>6% decreases</td>
<td>6% decreases</td>
<td>12% decreases</td>
</tr>
<tr>
<td>53% maintain</td>
<td>31% maintain</td>
<td>13% maintain</td>
</tr>
<tr>
<td>41% increases</td>
<td>63% increases</td>
<td>75% increases</td>
</tr>
</tbody>
</table>

Decrease | Maintain | Increase
AFTERMARKET

MRO goes digital
The rise in air traffic and load factors coupled with older fleets continuing to fly will have an overall positive impact on MRO in the long term. Some MRO providers have felt the impact from the 737 MAX grounding, as aircraft are parked without requiring significant maintenance. This trend is reflected in our survey results which show that more than 60% of aerospace and defense executives expect MRO spending to remain the same over the next 12 months. However, as overall MRO shop capacity remains cramped across the globe airlines prefer long-term contracts with MRO providers.

Sustained by the continued demands of both legacy and new aircraft fleets, the MRO market is becoming a significant driver of digital innovation, with companies utilizing connected and intelligent products to enhance their operational efficiency. We are seeing a flourishing of intelligent solutions, such as predictive analytics platforms, digital records management, reliability analysis and AR/VR solutions that promise to improve operator ROI. Integration of technologies such as artificial intelligence (AI) into predictive maintenance processes and distributed ledger technologies for asset and lifecycle management have the potential to enable significant cost reduction for airlines.

33% of aerospace and defense executives have ranked AI as the number one technology that will have the greatest impact on their organization over the next three years. Competition is expected to increase in the MRO market as both OEMs and MRO providers from North America and Europe expand their presence in the Asia Pacific region through joint ventures and partnerships.

CUSTOMER DELIVERIES

Slowdown due to MAX grounding and engine issues
Customer deliveries have been a persistent industry challenge for a variety of technical and regulatory reasons, as OEMs struggle to meet their delivery targets on some commercial aircraft programs. Only 34% of aerospace and defense executives expect to increase their unit delivery rates in 2019 compared to previous year, whereas 66% expect an increase in unit delivery rates in 2020. Boeing’s inventory of undelivered 737 MAX planes is costing the company a lot of money and it cannot resume MAX deliveries unless it receives regulatory approval. The engine issues with GE9X have also put the widebody 777X program at risk and could result in delayed deliveries for airlines.

As Airbus ramps up their production rate of the A320 family aircraft, it expects the second half of the year to be challenging in terms of deliveries.

Maintenance, Repair and Overhaul (MRO) Activity Outlook
(Percent of executives surveyed)

<table>
<thead>
<tr>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>3%</td>
<td>53%</td>
<td>44%</td>
</tr>
<tr>
<td>3%</td>
<td>63%</td>
<td>34%</td>
</tr>
<tr>
<td>22%</td>
<td>22%</td>
<td>56%</td>
</tr>
</tbody>
</table>

Decrease | Maintain | Increase
Some of its customers have already expressed their concerns regarding delays in delivery of the A321 LR aircraft. However, based on 1H19 data, Airbus has been surging ahead against Boeing in terms of deliveries. Airbus delivered 389 planes, increasing 28% YoY, whereas Boeing delivered 239 planes, declining 36% YoY.

**AIRLINE PERFORMANCE**

**Clouds looming ahead**

The tail-end of recent global economic expansion has been favorable to airlines and more specifically to the industry’s capacity growth. However, amid this expansionary period there have been warning signs that capacity growth has outstripped demand. Today, there are fresh signs of airlines preparing for an eventual downturn, indicating some vulnerabilities in their business outlook.

Looking back, from 2014 industry capacity growth has been strong at 6-7% annually. Profitability was relatively stable through 2017, helped by lower fuel prices and efficiency gains, including the benefits of newer fleets. These enabled airlines to support pricing strategies that allowed them to successfully fill new capacity. During this period prices fell by 3-6% annually across major traffic flows, with very few markets escaping the downward pressure on pricing.

2018 may have served as a transitional year. Based IATA data, industry margins fell by over 20% in 2018 as better cost performance dissipated. Pricing power remains elusive given the high levels of capacity growth and continued competition from new entrants and new business models. Airline industry margins continue to decline, driven by various factors such as labor and infrastructure costs. Global airline industry EBIT margins have declined from a peak of 8.6% in 2015 to a projected margin of 5.0% in 2019.  

Fast forward to today, and the industry is seeking ways to improve its performance and prepare for an eventual downturn in demand. Announcements from major carriers have provided forward warnings on yield erosion (e.g. American Airlines, Delta, Ryanair) or have announced significant cost reduction programs (e.g. United, Cathay Pacific, Etihad, WestJet). Meanwhile, growth from new entrants is also showing signs of weakness. For example, the largest Middle Eastern carriers have slowed their expansion and the viability of some new-entrants’ business models (e.g. transatlantic low-cost carriers) are coming into question. The severity of these pressures remains unclear, including what their impact will ultimately be on new aircraft deliveries.

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**Unit Deliveries Outlook**

(Unit Deliveries Shipped to Customers)

<table>
<thead>
<tr>
<th>2019 vs. 2018</th>
<th>2020 vs. 2018</th>
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</thead>
<tbody>
<tr>
<td><strong>Decrease</strong></td>
<td><strong>Maintain</strong></td>
</tr>
<tr>
<td>3% 63% 34%</td>
<td>9% 25% 66%</td>
</tr>
</tbody>
</table>
ENVIRONMENT SUSTAINABILITY

The dawn of new era of electric and hybrid- powered aviation

Environmental sustainability has become an important issue over the past few years and is now one of the top priorities for the aviation industry. The Air Transport Action Group has set a target to reduce CO₂ emissions to half of year 2005 levels by 2050. The IATA is working towards full implementation of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) which will cap net CO₂ emissions at 2020 levels (carbon-neutral growth, or CNG). Under CORSIA, airlines will need to purchase carbon offsets to compensate for their increase in CO₂ emissions.8

Despite huge orders to Boeing and Airbus, airlines now have a growing interest in hybrid and electric planes. Startups are competing with industry giants to develop electrically-propelled aircraft which are expected to disrupt urban and short-haul air transport in the next decade. Israeli startup Eviation announced the first order of its all-electric Alice aircraft with US regional carrier Cape Air this year. The focus on environmental sustainability is also evident in the new range of products and services being launched in the market. Capabilities such as smart flight planning and electric taxi are emerging to help reduce the aviation industry’s environmental impact. 59% of aerospace and defense executives say that more than half of their current annual revenues are from the sale of products or services that deliver reduced CO₂ emissions or fuel efficiency improvements for aircraft operators.9

Hybrid electric propulsion technology has the potential to disrupt engine OEMs’ existing business models, which explains why they are investing in these technologies to reap long-term benefits. Incumbents are active in this emerging space. Rolls Royce has acquired Siemens’ electric and hybrid-electric aerospace propulsion business. United Technologies has launched an advanced projects division to build and test a hybrid electric aircraft demonstrator. While electric propulsion holds immense potential to reduce CO₂ emissions in the future, AI is beginning to be used to power applications that analyze flight data and optimize fuel efficiency. Almost half of aerospace and defense executives cite AI among the top choice for technologies that can deliver reduced CO₂ emissions or fuel efficiency improvements in the next three years. However, more than 50% of executives cite alternative fuels, electric propulsion and new aircraft electrical architectures among the top choices for technologies in the 10-year time horizon that promise to transform the pace at which they deliver reduced CO₂ emissions or fuel efficiency improvements for aircraft operators.
RISKS

What keeps aerospace executives up at night?

Macroeconomic risk factors continue to weigh on industry executives’ minds. Worsening economic conditions and interest rate changes are laying the groundwork for near-term executive concerns.

While the impacts from other factors such as political instability, terrorism, regional armed conflicts and exchange rate changes are expected to be similar in the near term, they are predicted to increase over the next two years.

Risk factors for Commercial Aerospace

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Next 6 months</th>
<th>Next 12 months</th>
<th>Next 2 years</th>
</tr>
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<tbody>
<tr>
<td>Terrorism</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Political instability</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Worsening economic conditions</td>
<td>Medium</td>
<td><strong>Higher</strong></td>
<td>High</td>
</tr>
<tr>
<td>Regional armed conflicts</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Interest rate changes</td>
<td>Medium</td>
<td><strong>Higher</strong></td>
<td>High</td>
</tr>
<tr>
<td>Exchange rate changes</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>
NORTH AMERICA OUTLOOK

Witnessing slowdown due to 737 MAX

2019 North America aerospace annual growth is expected to remain almost flat, declining slightly 0.4% YoY. While we will see softness in demand in the second half of 2019, primarily due to the impact of the 737 MAX grounding, quarterly YoY growth will be generally higher in the first and second quarter of 2020 as Boeing resumes 737 production at the rate of 52 per month (assuming it receives regulatory approval for the return to service). Overall, 2019 commercial aerospace industry annual growth is expected to slightly decline by 0.4% YoY. The first half of 2020 is expected to be significantly stronger than 2019, primarily driven by resumption of 737 MAX deliveries from inventory.

2020 promises to get the North American market back on track, with growth anticipated to increase 10.5% YoY. Growth is expected to sustain in 2020, accelerating in both the first and second halves of the year compared to the same period in 2019. Despite the 737 MAX crisis, Boeing was able to secure a deal at the Paris Air Show as International Airlines Group (IAG), the parent company of Aer Lingus, British Airways, Iberia, and Vueling, signed a letter of intent with Boeing to buy a fleet of 200 737 MAX jets worth $24 billion.

North America Outlook

<table>
<thead>
<tr>
<th>2019 vs. 2018</th>
<th>1H20 vs. 1H19</th>
<th>2020 vs. 2019</th>
</tr>
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<tbody>
<tr>
<td>Flat</td>
<td>Increasing</td>
<td>Increasing</td>
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ASIA PACIFIC OUTLOOK

Witnessing slowdown in growth but expected to recover in 2020

2019 annual demand is expected to be up 5.1% YoY, with China continuing its economic slowdown and contraction in manufacturing. Due to the slowdown in China, 2019 is anticipated to post moderate growth for the Asia Pacific region. However, our forecast hints at growth increasing in 2020, primarily driven by the first half of the year’s activity witnessing 6.4% YoY growth compared to 1H19.

The long-term outlook for the region remains strong, driven by significant fleet growth. This year, Air China, China Southern Airlines, and China Eastern Airlines have placed orders for purchasing 35 ARJ21-700 regional jets each from COMAC with a $4B total order value. US-based regional carrier Mesa Airlines has placed a firm order with Mitsubishi for 50 SpaceJet M100 aircraft with a purchase option for 50 more in a deal worth $3.7B. Mitsubishi has also announced it will acquire the CRJ program from Bombardier in order to support its commercial aerospace ambitions. Overall, the Asia Pacific region is expected to see 5.1% annual growth for 2019. Growth is anticipated to increase slightly in 2020, at 5.8% YoY compared to 2019.

Asia Pacific Outlook

<table>
<thead>
<tr>
<th>2019 vs. 2018</th>
<th>Increasing</th>
</tr>
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<tbody>
<tr>
<td>1H20 vs. 1H19</td>
<td>Increasing</td>
</tr>
<tr>
<td>2020 vs. 2019</td>
<td>Increasing</td>
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</tbody>
</table>
EUROPEAN OUTLOOK

Rise in growth but risk of a no-deal Brexit looming large over aerospace manufacturing in the UK

Relative to 2018, the second half of 2019 is expected to see slow growth in commercial aerospace demand. A strong 1H19 driven by air traffic growth has kept a healthy overall yearly growth rate of 6.1% for 2019. The 2H19 slowdown is expected to be driven by declining German exports and ongoing Brexit uncertainty which has resulted in weakness of air traffic passenger demand. However, the long-term outlook for the region remains positive. This year, International Airlines Group (IAG) placed 14 firm orders for Airbus A321 XLR aircraft at the Paris Air Show with an option of 14 more aircraft, including six for Aer Lingus and eight for Iberia Airlines.

Several UK aerospace companies are seeking to be regulated under the jurisdiction of the European Aviation Safety Agency (EASA) or other EU authorities in order to be able to sell new components or parts to European customers in the event of a no-deal Brexit. The risk of a no-deal Brexit threatens to disrupt the aerospace supply chain, which could negatively impact Airbus manufacturing in the UK. Growth is anticipated to slow in the second half of 2020, with overall growth reaching 5.8% YoY from 2019.

Europe Outlook

<table>
<thead>
<tr>
<th>2019 vs. 2018</th>
<th>1H20 vs. 1H19</th>
<th>2020 vs. 2019</th>
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</thead>
<tbody>
<tr>
<td>Increasing</td>
<td>Increasing</td>
<td>Increasing</td>
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</table>
MIDDLE EAST OUTLOOK

Sustaining strong growth driven by used serviceable material and parts suppliers as well as MRO

In 2019, we expect to see an annual commercial aerospace market increase of 6.8%, primarily driven by a strong first half. This will likely be tempered by slower growth in the second half of 2019. Volatile oil prices and geopolitical tensions in the region have impacted passenger demand, resulting in losses for the airlines. Commercial aerospace growth in 1H20 is anticipated to be 8.6% higher than 1H19 which, overall, sets up for a solid 2020.

UAE’s Strata Manufacturing’s combined orderbook of $7.5B from Boeing and Airbus for parts manufacturing over the next decade is expected to be the major revenue driver for the region. Strata is planning to expand its manufacturing facility for assembly of 787 parts.

The region will experience strong aftermarket growth as MROs look to expand their presence. For example, Magnetic MRO entered into an agreement with FPSS of Saudi Arabia to jointly establish their facilities in the region.

This year, Airbus subsidiary Satair signed an agreement with Joramco, a subsidiary of Dubai Aerospace Enterprise for the supply of consumables for both Airbus and Boeing aircraft. As Middle Eastern suppliers enhance their position in the commercial aerospace global supply chain and traffic growth continues, aerospace revenues for the region are expected to increase, growing at 7.1% YoY in 2020.

Middle East Outlook

<table>
<thead>
<tr>
<th>2H19 vs. 2H18</th>
<th>2019 vs. 2018</th>
<th>1H20 vs. 1H19</th>
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</thead>
<tbody>
<tr>
<td>Increasing</td>
<td>Increasing</td>
<td>Increasing</td>
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</table>
LATIN AMERICA OUTLOOK

Positive outlook in 2019 driven by LCC expansion

In 2019, we expect to see annual commercial aerospace industry demand increase by 9.9%, driven significantly by a strong first half with proliferation of low-cost carriers, however slowdown is expected in the second half of the year amid the bankruptcy filing by Avianca, one of the major air carriers in Latin America. The second half of 2019 is expected to decline 1.1% compared to the same period last year. Brazil’s third largest carrier, Azul, is planning to acquire some of the assets of the troubled airline Avianca Brazil, including its 30 A320 family aircraft.

In December 2018, Brazilian low-cost carrier (LCC) Azul placed a firm order for an additional 21 Embraer E195-E2 aircraft in a deal worth $1.4B which now brings Azul’s orders up to 51 aircraft. With a softening of both airline capacity growth and Embraer deliveries, Latin American market growth is expected to slow to 5.1% YoY in 2020.

Latin America Outlook

<table>
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<th>2H19 vs. 2H18</th>
<th>2019 vs. 2018</th>
<th>1H20 vs. 1H19</th>
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<td>Decreasing</td>
<td>Increasing</td>
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2018 was a strong year for commercial aerospace, with record commercial aircraft deliveries. Boeing and Airbus together accounted for 1600+ deliveries, growing at 7.8% YoY compared with aircraft delivered in 2017. However, 2019 has been significantly challenged, experiencing a growth slowdown with the global 737 MAX grounding. Airbus delivered 389 jets in 1H19 increasing 28% YoY which was significantly higher than Boeing, which delivered only 239 jets, declining 37% YoY. The huge decline for Boeing was primarily due to undelivered 737 MAX inventory, which is currently awaiting regulatory approval to fly. The grounding has also resulted in a huge financial impact for Boeing which reported its largest ever quarterly loss of $3.4B in 2Q19.

In response to the 737 MAX grounding, it had reduced its production rate from 52 to 42 per month. However, Boeing should be able resolve the software issues on MAX and resume production at the rate of 52 per month. Airbus is on track to achieve its production rate of 60 per month for the A320 and expects to increase this to 63 per month by 2021.

Looking at megadeals in 2019, Airbus signed a deal worth $35 billion with China to sell 300 aircraft comprising 290 narrow-body A320 aircraft and 10 wide-body A350 aircraft, whereas Boeing secured a deal worth $24 billion with International Airlines Group for 200 737 MAX aircraft. However, the latter is not yet a firm order. Pricing is a decisive factor in megadeals and airlines are likely to receive a discount as high as 40% to 60% on list prices, as revealed by Airbus this year in its disclosure of the net value of orders.

Both Airbus and Boeing have commercial aircraft backlogs of more than five years. Ongoing production ramp ups will continue to put pressure on costs and drive additional investments in efficiency, production automation, cost visibility, and supplier development. Suppliers are struggling to keep up with the reality of production rate increases, with efficiency gains and investment the order of the day to maintain pace with new and announced product rate increases. Significant backlogs will allow both Airbus and Boeing to ride through order volatility.

Lagging retirements and additional shop visits for older platforms will provide additional opportunities for cost-competitive third-party MROs and may delay the ability of OEMs to differentiate themselves through proprietary service offerings targeted at newer platforms. These factors all contribute to our estimate of a $76 billion global commercial MRO market in 2019.
APPENDIX: REGIONAL INDEXES

North America

North America Commercial Aerospace Index
(USD, 2015 = 100)

North America Commercial Aerospace Index Performance
(quarterly YoY percent change)
Asia Pacific

Asia Pacific Commercial Aerospace Index
(USD, 2015 = 100)

Asia Pacific Commercial Aerospace Index Performance
(quarterly YoY percent change)

NOTE: that due to half-year reporting periods for most Asia aerospace companies, quarterly results are amplified when compared to other regions.
Europe

Europe Commercial Aerospace Index
(USD, 2015 = 100)

Europe Commercial Aerospace Index Performance
(quarterly YoY percent change)
Latin America

Latin America Commercial Aerospace Index
(USD, 2015 = 100)

Latin America Commercial Aerospace Index Performance
(quarterly YoY percent change)
Middle East

Middle East Commercial Aerospace Index
(USD, 2015 = 100)

Middle East Commercial Aerospace Index Performance
(quarterly YoY percent change)
Combining sophisticated econometric modeling methodologies, to drive quantitative quarterly forecasts on the health of the commercial aviation market, with insights from leading industry executives worldwide, the Accenture Commercial Aerospace Insight Report, provides a unique perspective on short- and medium-term trends and drivers in this market. Instead of focusing solely on OEM sales, the report covers a wide range of activities, from suppliers to MROs.

Notes: The index baseline year is 2015, both regional and global indices are based on 2019 figures.

To complement the econometric modeling, executives at major commercial aerospace companies were polled for their insights on future supply and demand outlook. The outlook indicators in this report are based on the combination of the econometric modeling and a global commercial aerospace executive poll.
References

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