

# MRO ASIA 2018

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Oliver Wyman's Aviation, Aerospace & Defense practice is the largest and most capable consulting team dedicated to the industry

#### OUR EXPERIENCE

- ~250 professionals across Europe and North America
- Deep aviation knowledge and capabilities allow the practice to deliver data-driven solutions and provide strategic, operational, and organizational advice
- Increased technical aviation expertise in Europe from 2017 acquisition of UK-based AVISA Aviation Safety Systems

#### OUR CLIENTS

We have worked with many of the industry's Fortune 500 companies, including

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- Leading airlines, MROs, OEMs, and independent parts manufacturers in the Americas, Europe, and Asia
- Dominant aerospace and defense firms

#### OUR APPROACH

**Data-driven:** unbiased benchmarking and forecasting tools to establish problems and identify solutions

**Innovative:** ideas that are forward-thinking

**Actionable:** results-oriented recommendations

**Collaborative:** an emphasis on working with our clients, alongside executives, management, and support teams

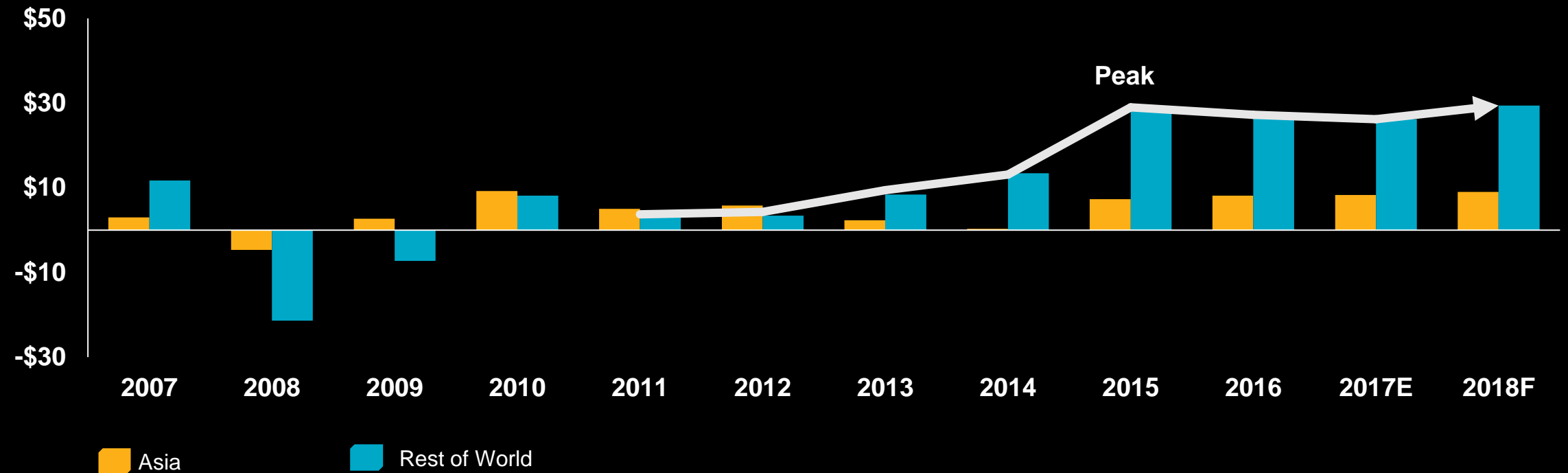
This presentation incorporates Oliver Wyman's 2018–2028 Global Fleet and MRO Market Forecast and 2018 MRO Survey, both of which are available at [oliverwyman.com](http://oliverwyman.com)



# 1 | Industry Overview

# Asian operators continue to trend with global profitability through 2018

**Global Commercial Air Transport Industry Net Profit**  
*By year/US\$ BN*



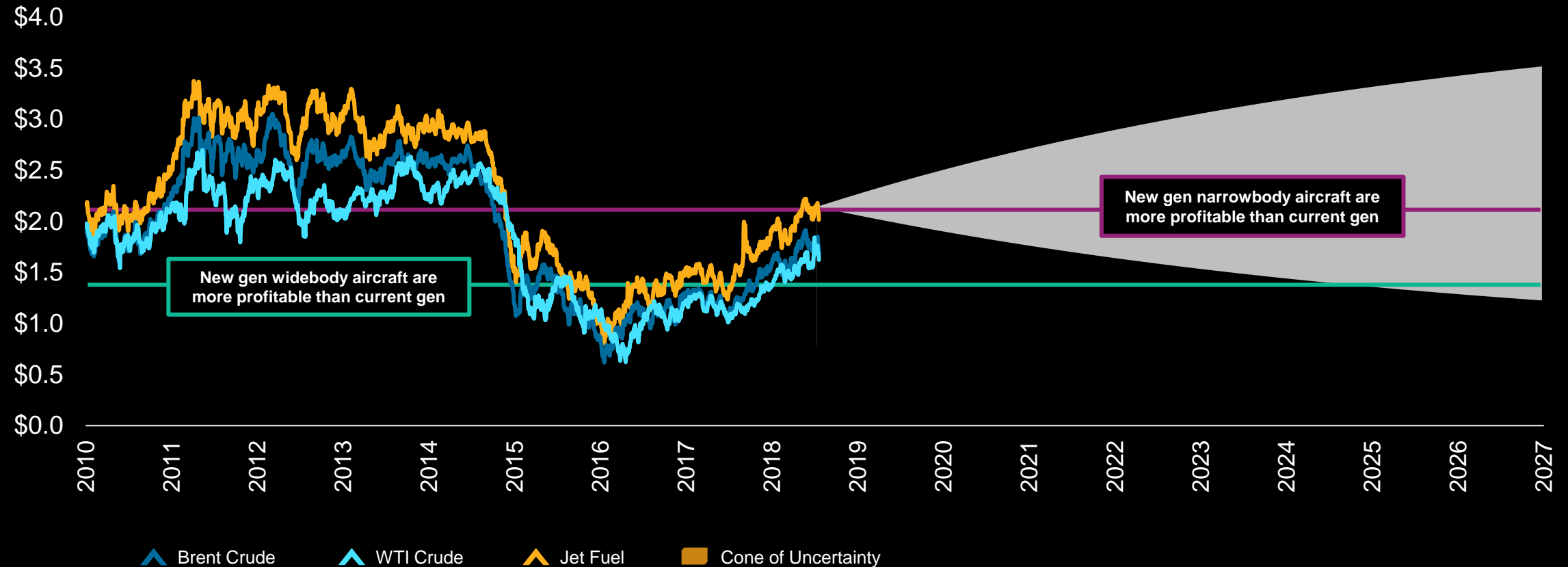
Continued growth in revenue from ancillaries and lower fuel costs are helping global operators offset the impact of shifting economics

Source: Source: IATA

# As oil prices rebound, operators will face new cost pressures, particularly with the older generation widebody aircraft

## Crude Oil and Jet Fuel Spot Prices per Gallon

By year/US\$ BN

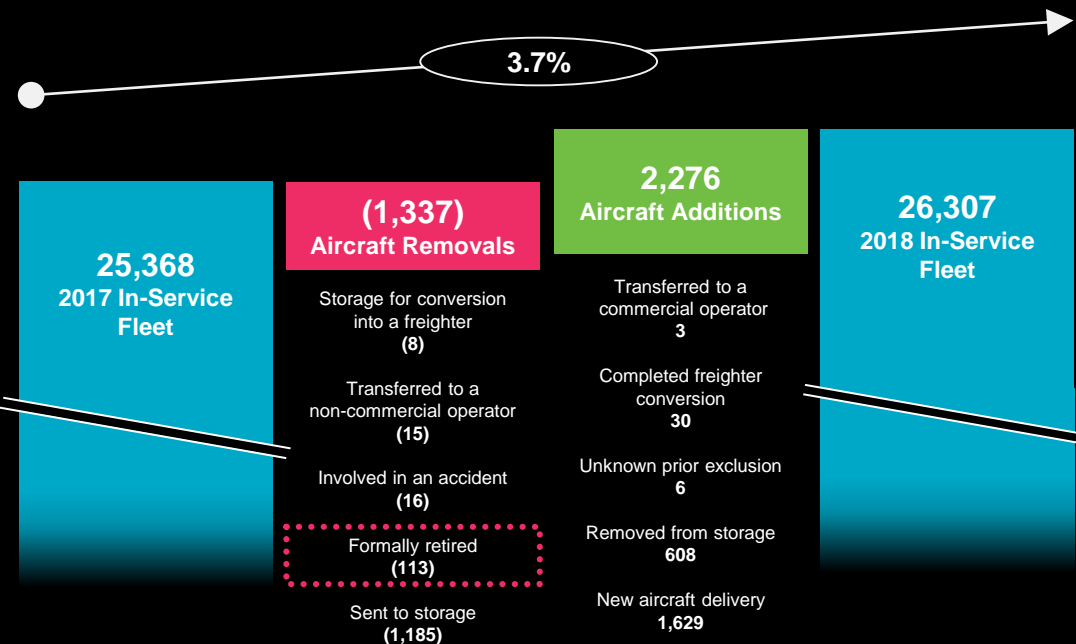


Source: U.S. Energy Information Administration, Oliver Wyman Analysis

Over the past year, status changes to 3,613 aircraft have lead the global in-service fleet to experience a net growth of 939 aircraft, representing a 3.7% annual growth rate

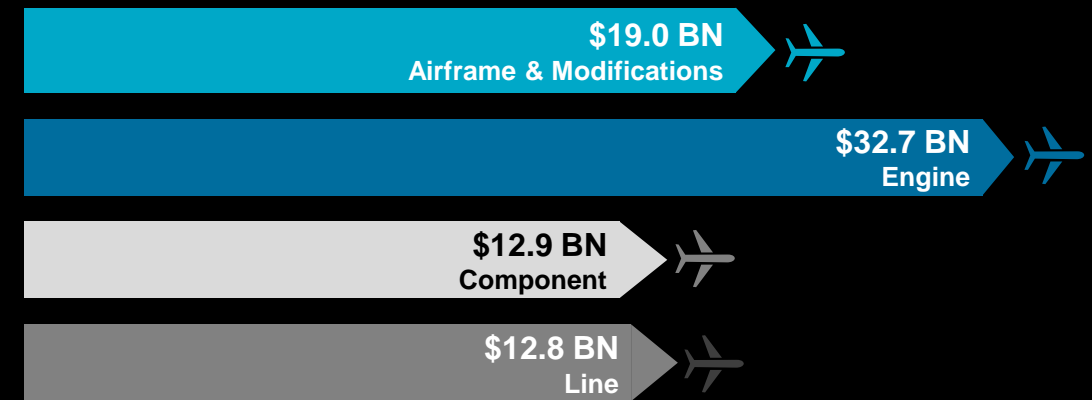
### Year Over Year Changes to the Global Commercial Air Transport In-Service Fleet

*By Transaction Type*



### 2018 Global Commercial Air Transport MRO Market Forecast

*By MRO Segment*

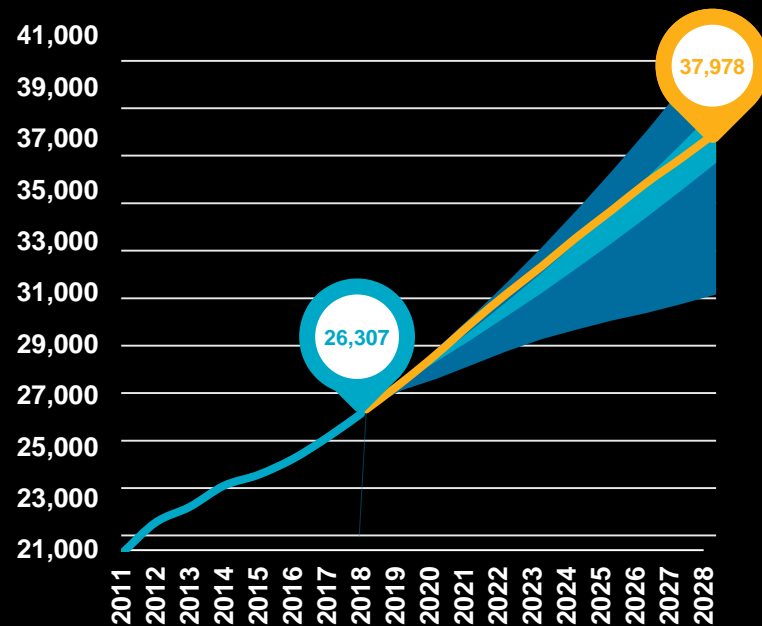


Translating the changing fleet dynamics into MRO, the 2018 market is forecast to be \$77.4 BN, with engine MRO continuing to be the driver of growth

Though the global fleet & MRO market are expected to increase by nearly 50% by 2028, increasing costs (e.g., oil prices) and external market factors (e.g., interest rates) create considerable uncertainty for realized growth

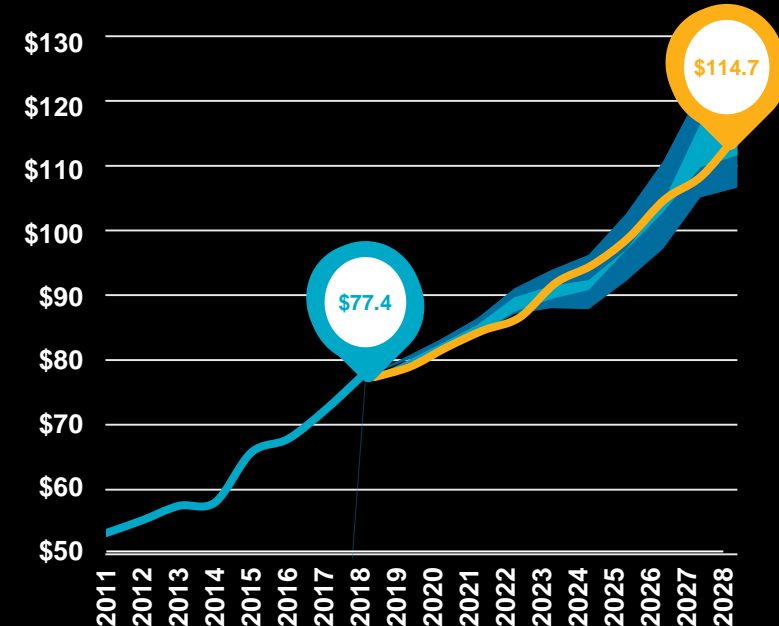
### Global Commercial Air Transport Fleet Forecast

By year/number of aircraft



### Global Commercial Air Transport MRO Market Forecast

By year/US\$ BN



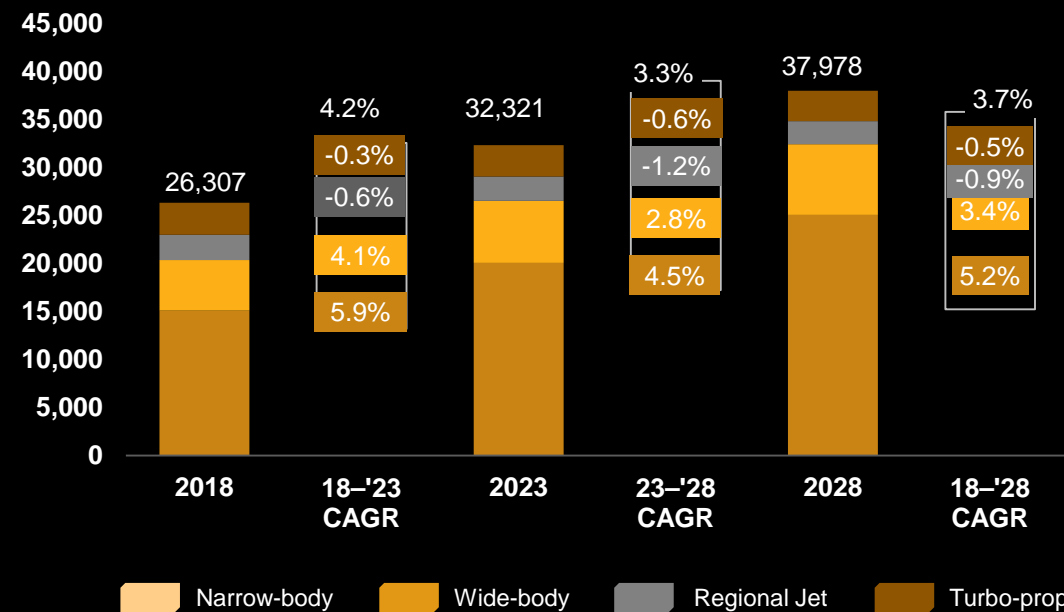
■ Likely Case Alternate Scenarios    
 ■ Best/Worst Case Alternate Scenarios    
 ▲ Historical Fleet    
 ▲ Forecast Fleet

Increased global tariffs could drive the forecasts to the lower bounds and shave several years of growth off the industry's potential

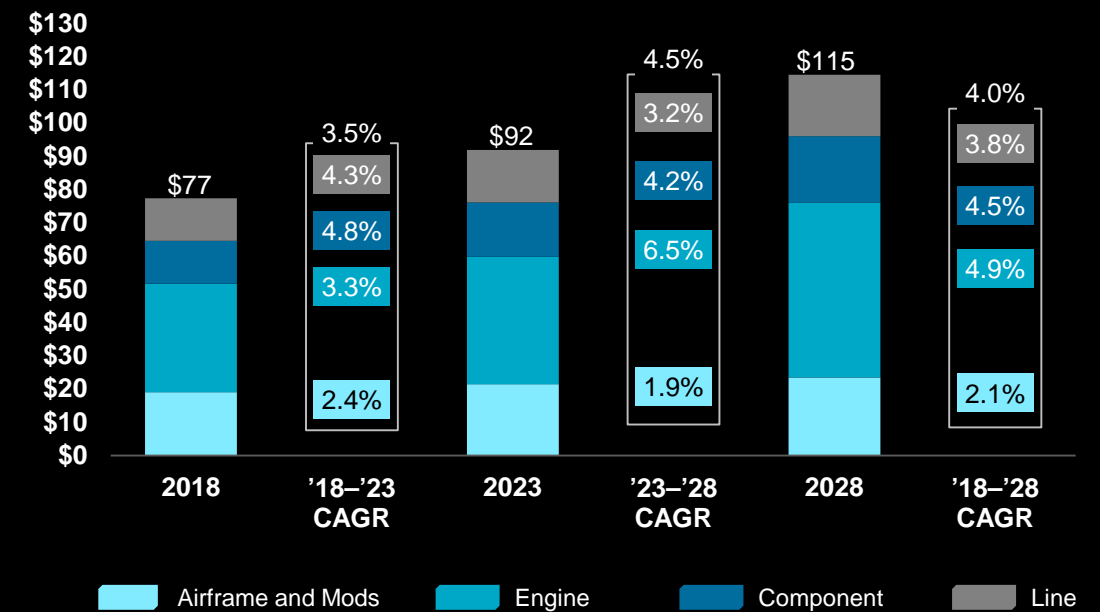


The global fleet is forecast at an annual growth rate of 3.7%, while the MRO market is forecast to grow at an annual rate of 4.5%

**Global Commercial Air Transport Fleet Forecast**  
By Aircraft Class/number of Aircraft



**Global Commercial Air Transport MRO Forecast**  
By MRO Segment/US\$ BN

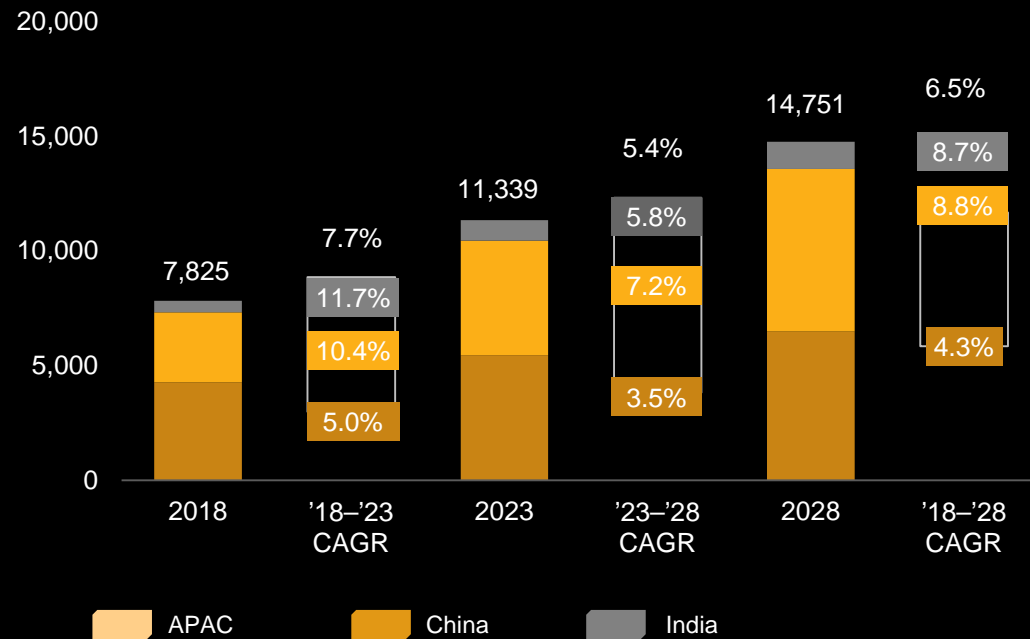


Next gen narrow body aircraft will dominate the global fleet growth, while expensive engine shop visits associated with more fuel efficient technologies will drive the growth in the MRO market

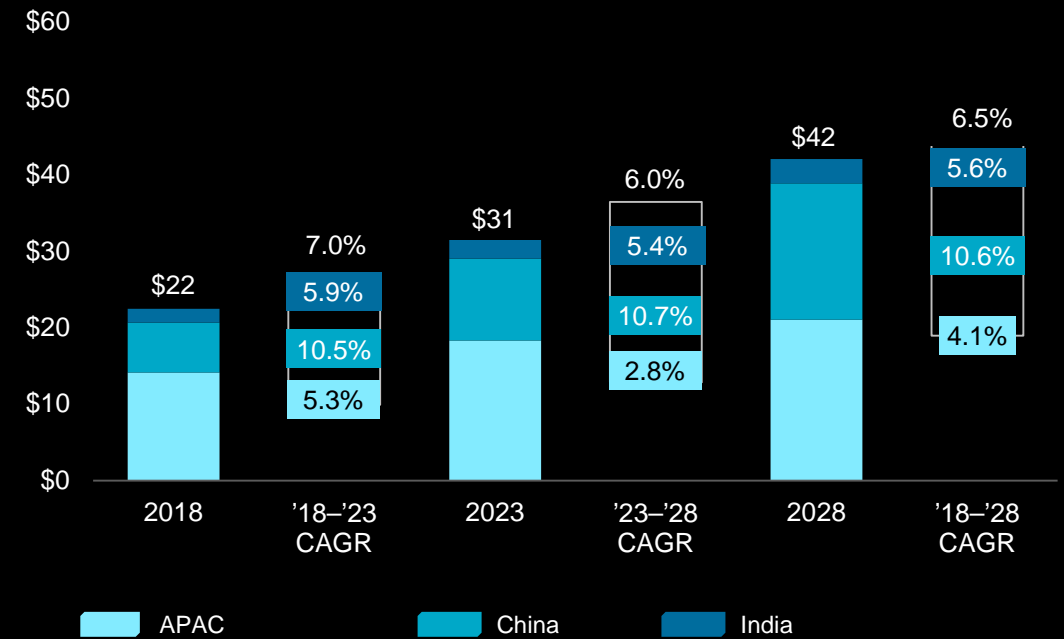
Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

# Asia is forecast to experience average growth of 6.5%, reaching a fleet size close to 15,000 aircraft by 2028

**Asia Commercial Air Transport Fleet Forecast**  
By Aircraft Class/number of Aircraft



**Asia Commercial Air Transport MRO Forecast**  
By MRO Segment/US\$ BN

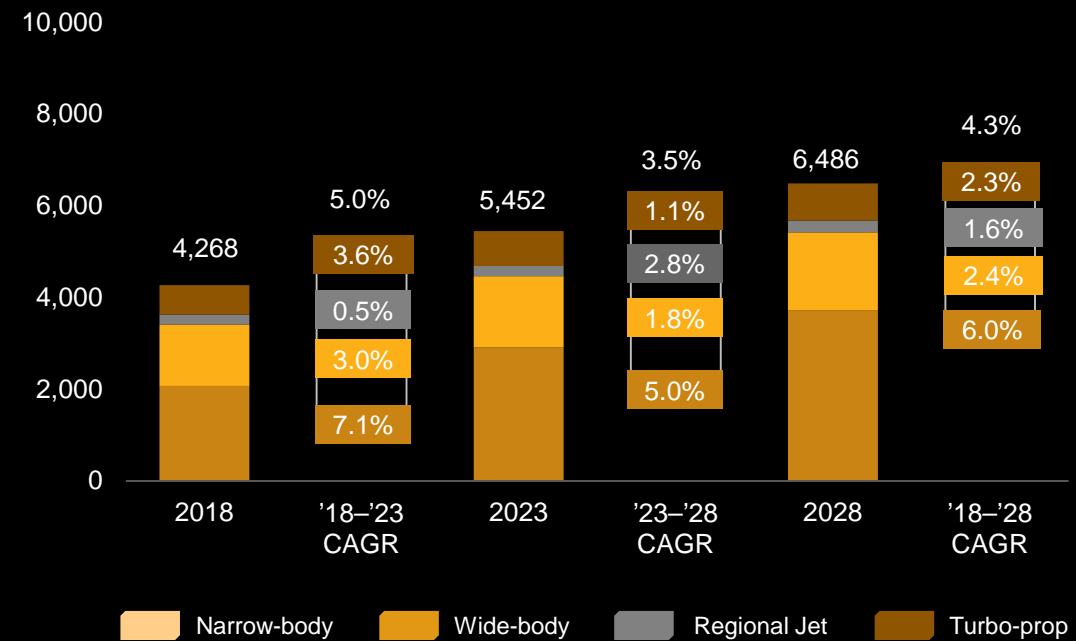


Asia excluding China and India (APAC) is expected to grow at a strong 4% in both fleet and MRO spend over the next ten years

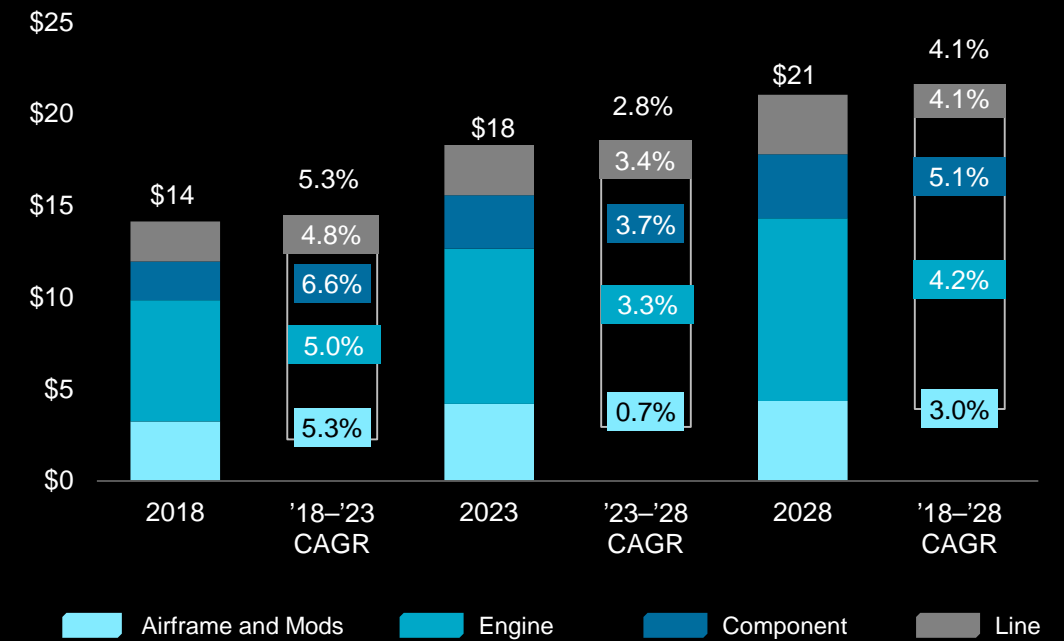
Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

# Asia Pacific is forecast to experience average growth of 4.3%, reaching a fleet size close to 6,500 aircraft by 2028

**APAC Commercial Air Transport Fleet Forecast**  
By Aircraft Class/number of Aircraft



**APAC Commercial Air Transport MRO Forecast**  
By MRO Segment/US\$ BN

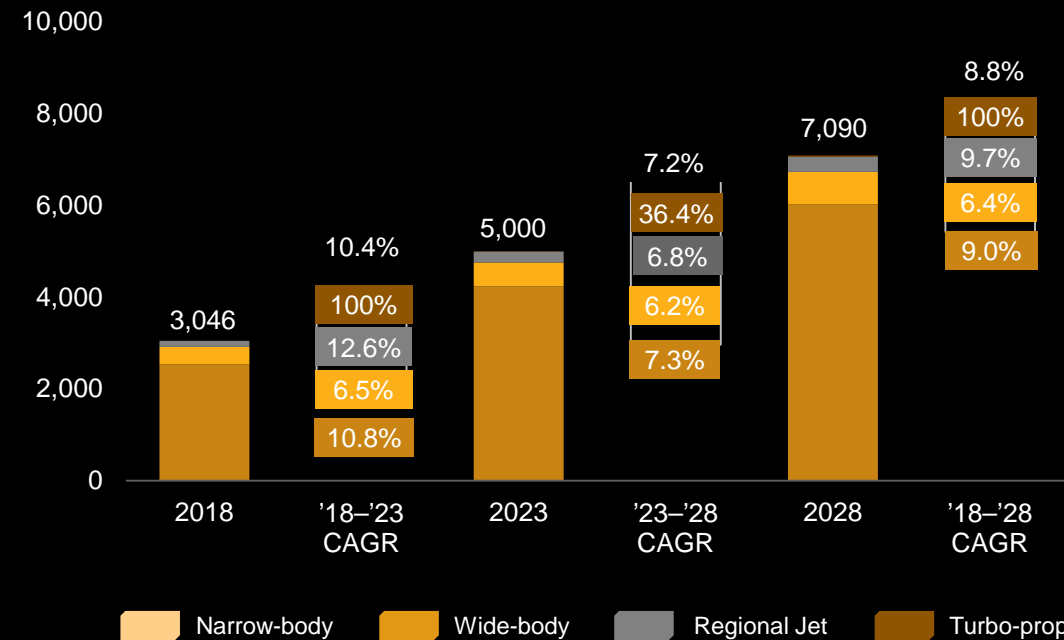


APAC MRO spend is expected to accelerate over the first five years before slowing to 2.8% over the second half of the forecast period, bringing the average annual growth to 4.1%

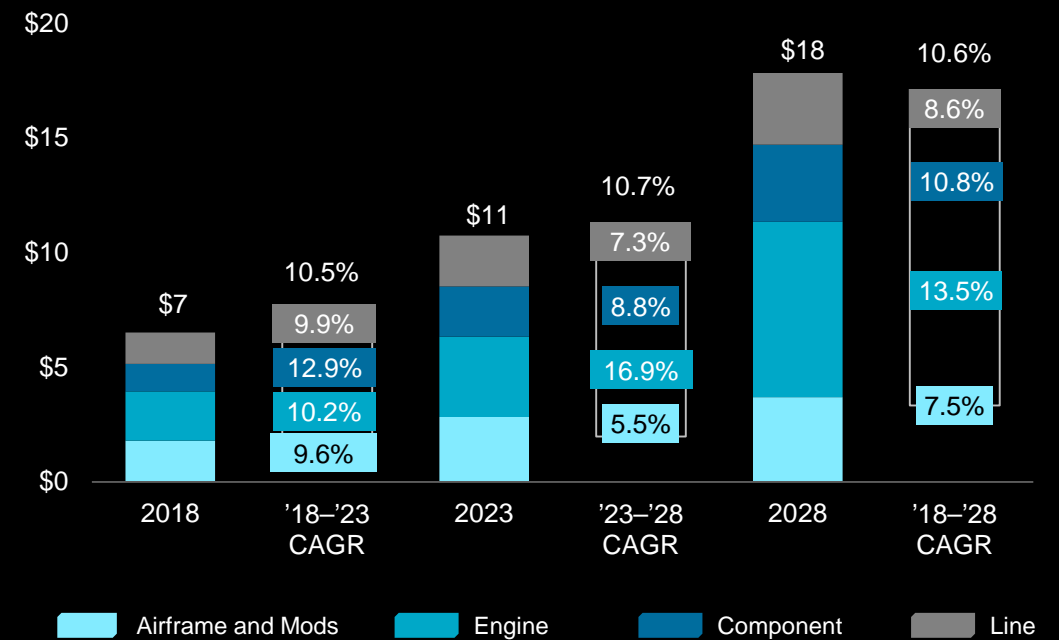
Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

# China is forecast to experience average growth of 8.8%, reaching a fleet size over 7,000 aircraft by 2028

**China Commercial Air Transport Fleet Forecast**  
By Aircraft Class/number of Aircraft



**China Commercial Air Transport MRO Forecast**  
By MRO Segment/US\$ BN

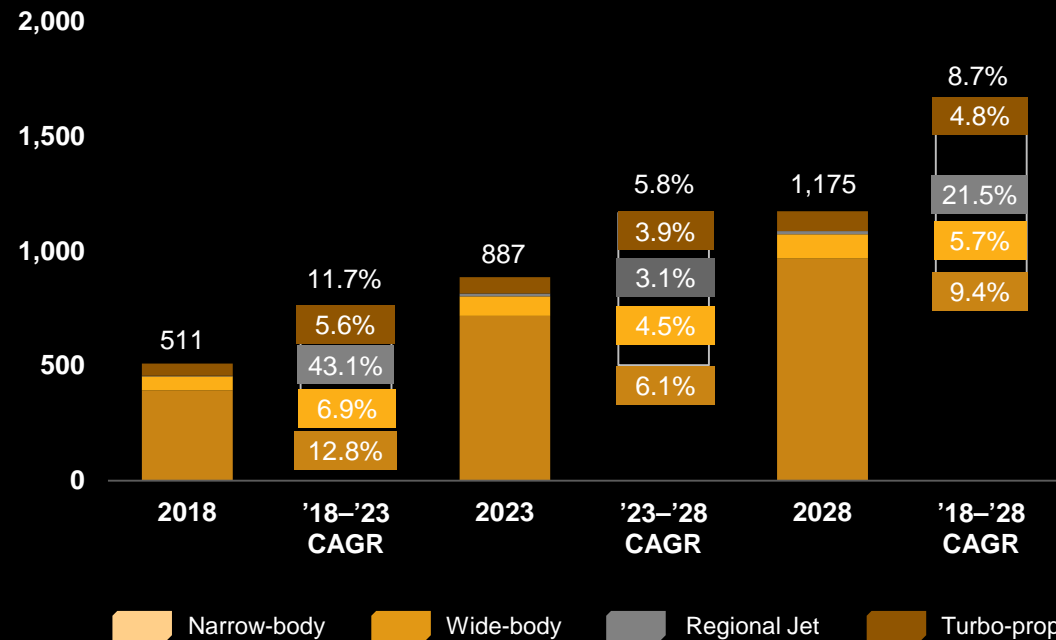


China MRO spend is expected to grow double digits over the course of the forecast period, as the in-service fleet growth will drive the need for continuous maintenance spend

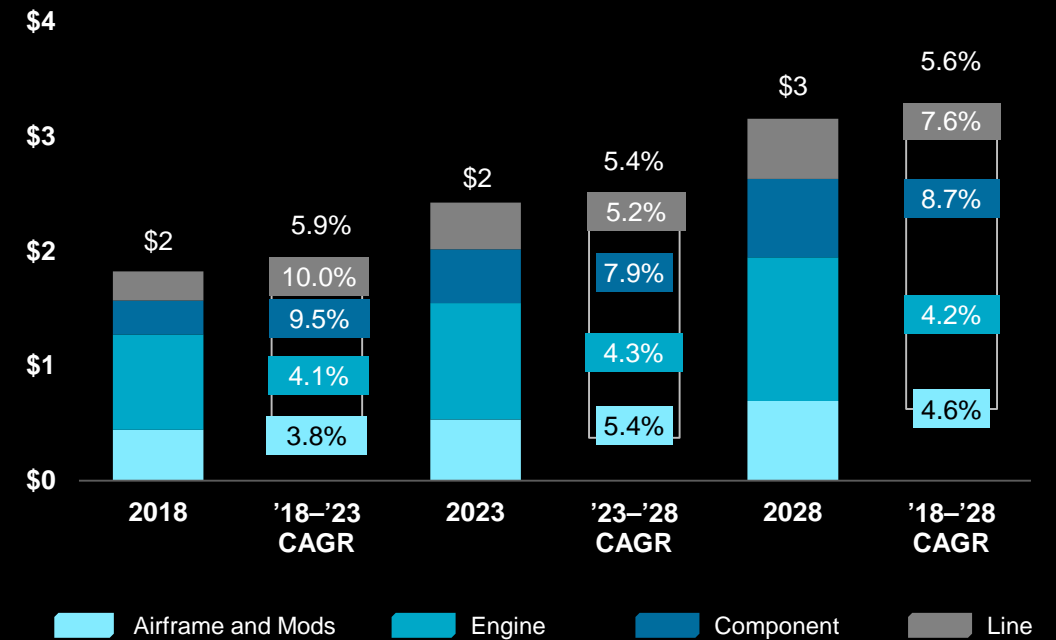
Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

# India is forecast to experience average growth of 8.7%, reaching a fleet size close to 1,200 aircraft by 2028

**India Commercial Air Transport Fleet Forecast**  
By Aircraft Class/number of Aircraft



**India Commercial Air Transport MRO Forecast**  
By MRO Segment/US\$ BN



The India in-service fleet will experience strong growth over the next 5 years, driven by narrowbody aircraft. India MRO spend will grow gradually over the next 10 years.

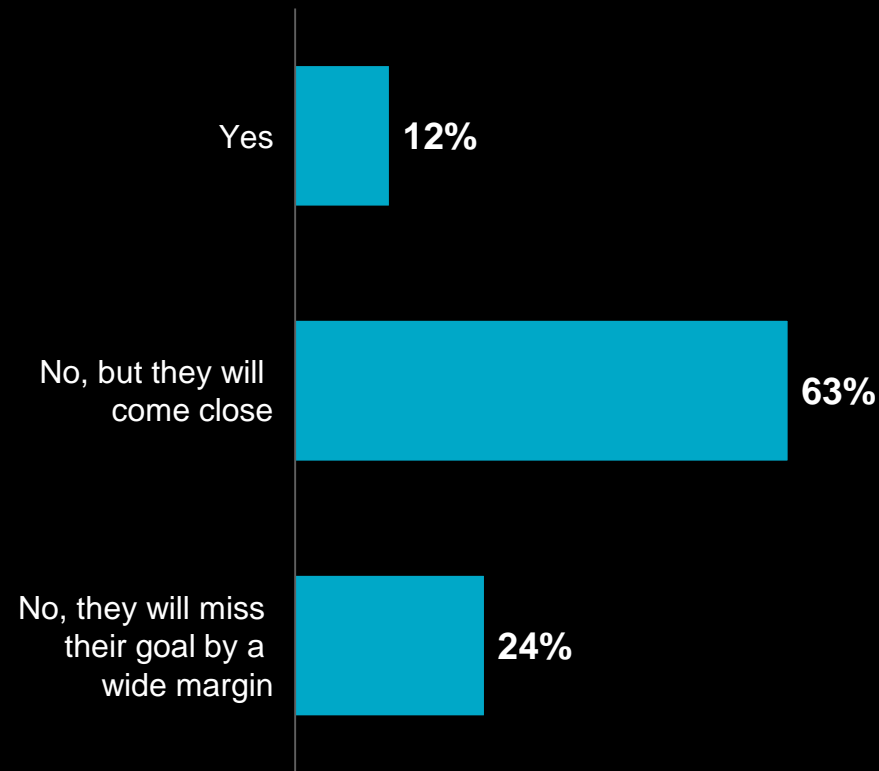
Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

## 2 | Dealing with rising costs

This year's survey indicates that 75%+ of respondents see OEMs as credible in their ambitions and expect them to gain market share over the next three years

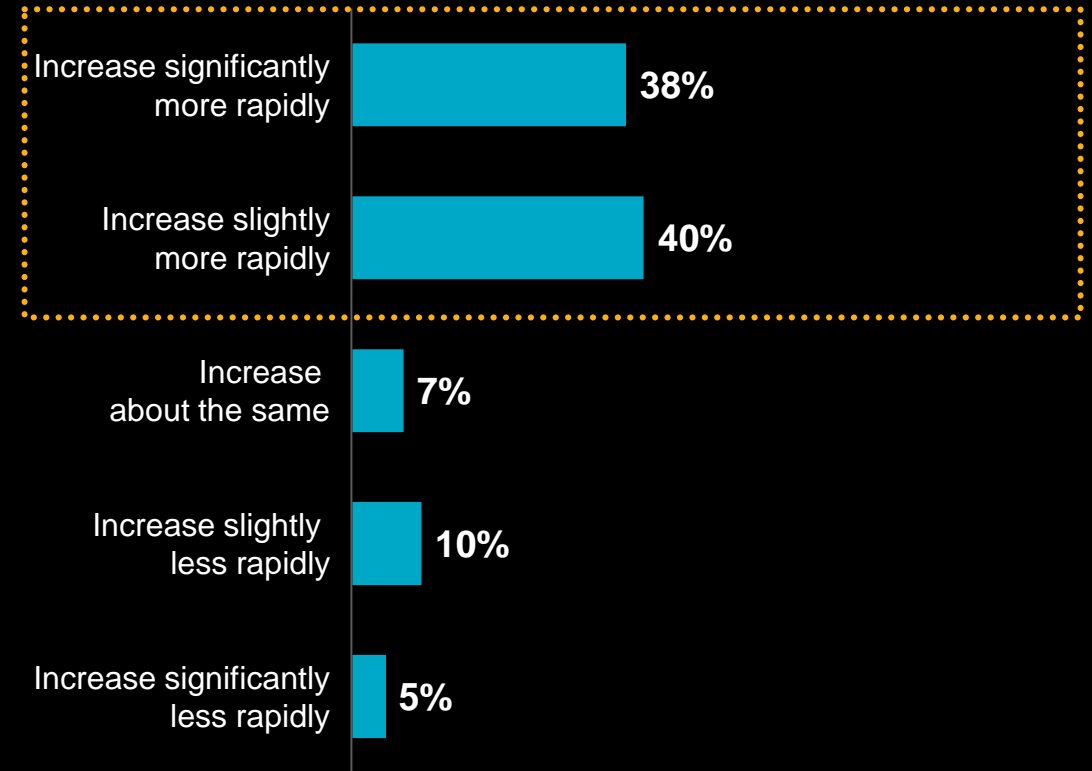
Do you think OEMs' growth targets for their aftermarket business units are achievable within the next decade?

*Distribution of total responses*



Compared to the market growth, OEMs' share of the aftermarket over the next 3 years will...

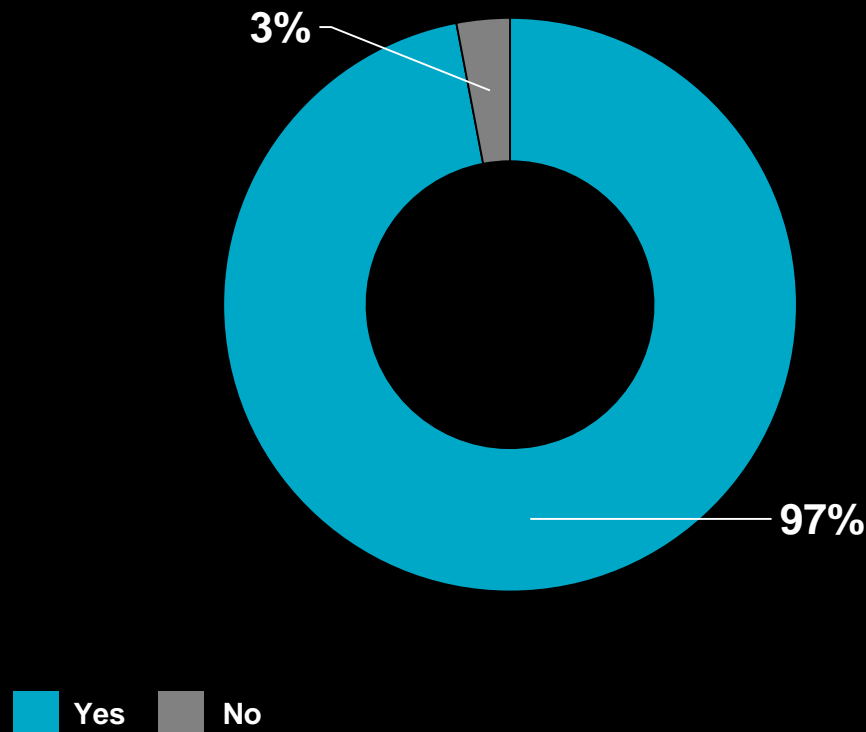
*Distribution of total responses*



Almost all respondents report experiencing increasing material costs; not surprisingly, MROs and operators overwhelmingly attribute their material cost increases to OEM actions

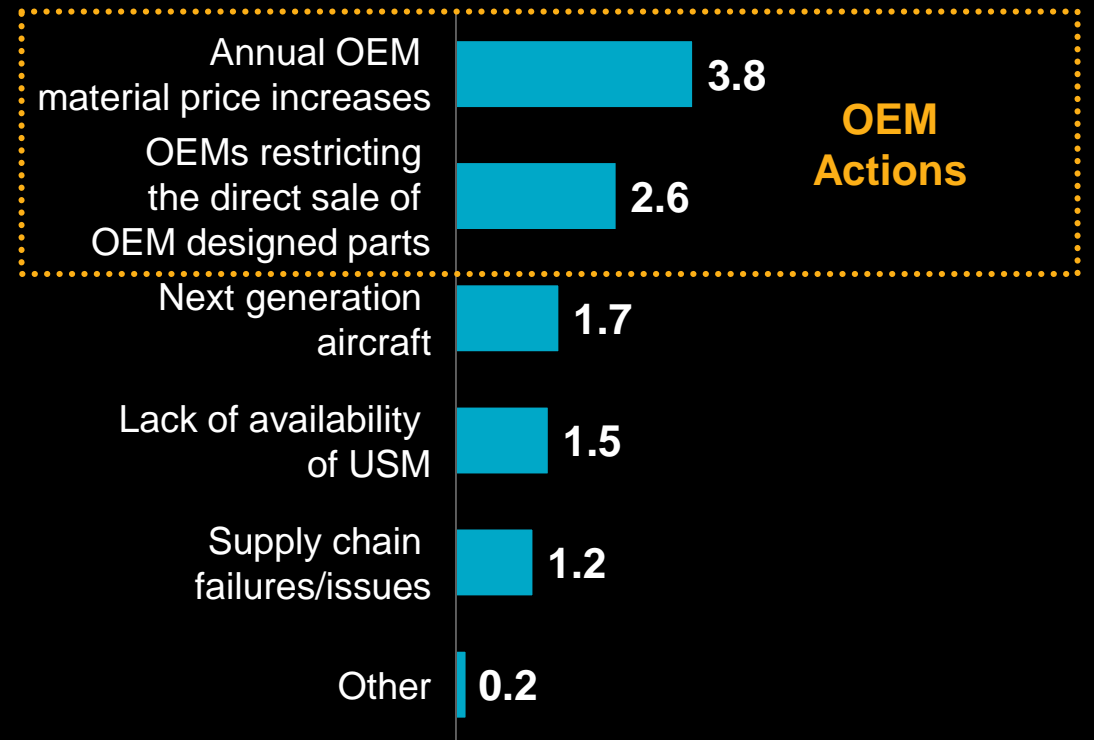
### Have you experienced an increase in material costs?

*Distribution of responses*



### Main drivers of material cost increases (for yes responses)

*Weighted average of rankings (highest to lowest ranking, scale of 1–5)*

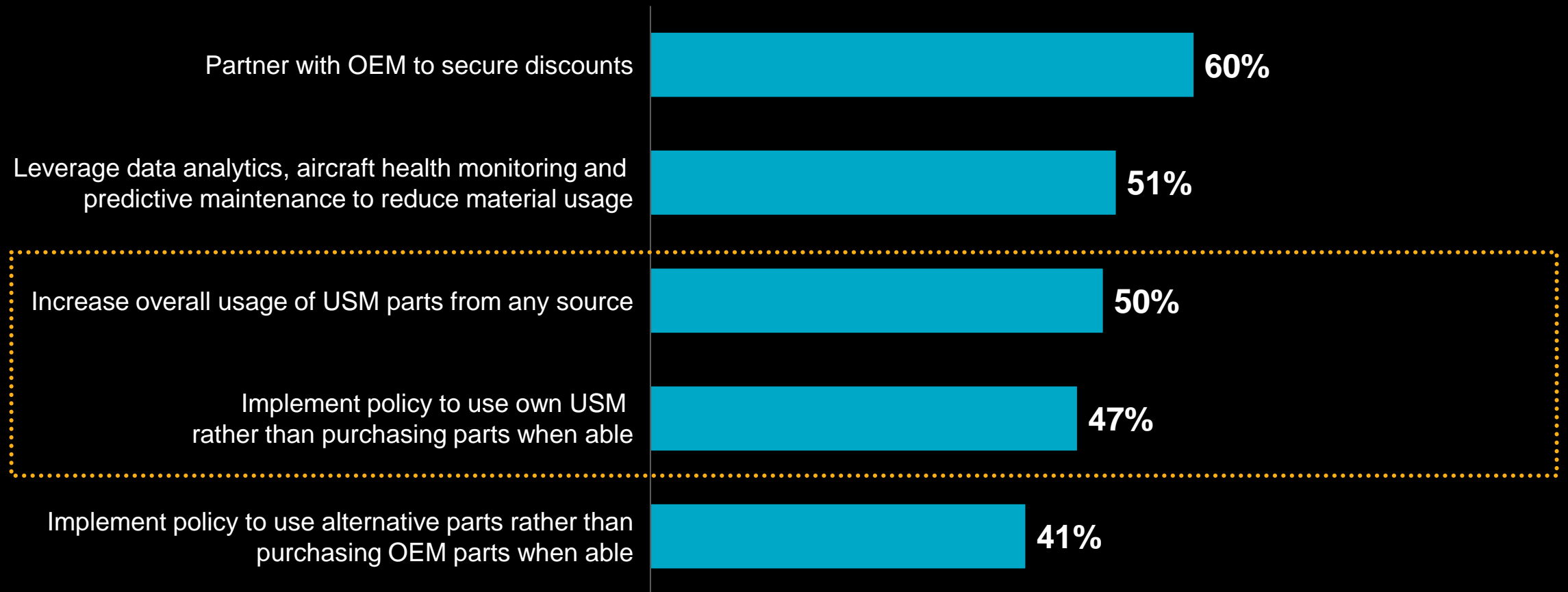




Though respondents have no single strategy to combat rising costs, many non-OEM respondents have included leveraging partnerships, USM or technology in their strategic plans

**What strategy or strategies have you adopted or are you considering to combat rising material costs?**

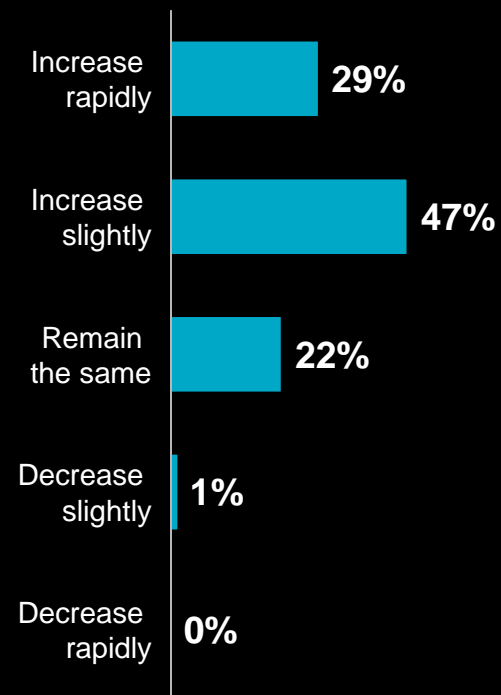
*% of respondents who selected each response (for top 5 strategies only)*



# An increase in USM from a small base is expected; however, lack of supply and lack of a clear sourcing strategy are big inhibitors

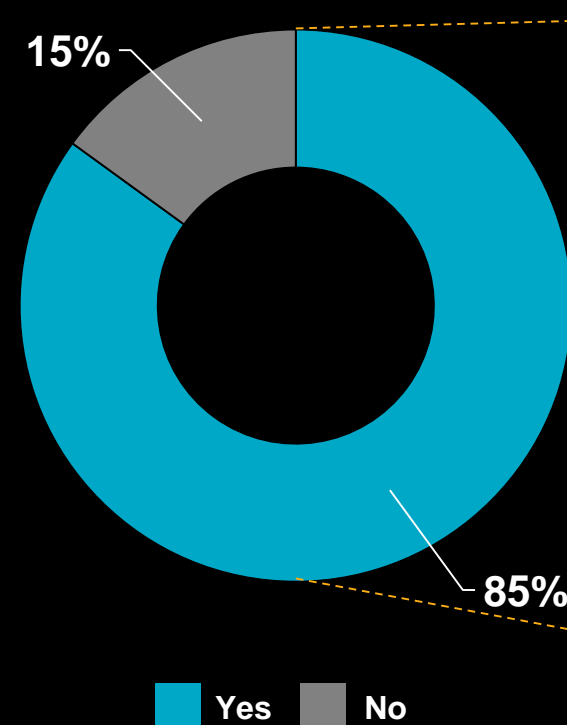
## How will your USM change over the next 5 years?

*Distribution of total responses*



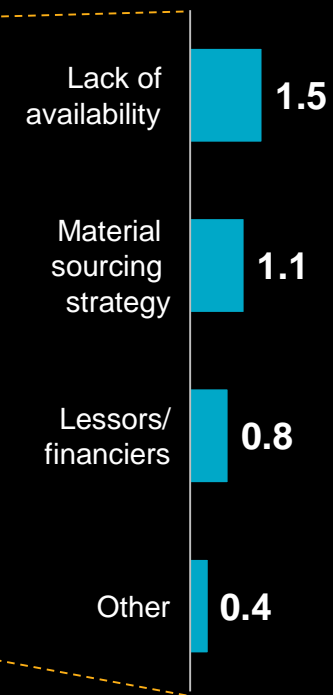
## Is your use of USM inhibited?

*Distribution of total responses*

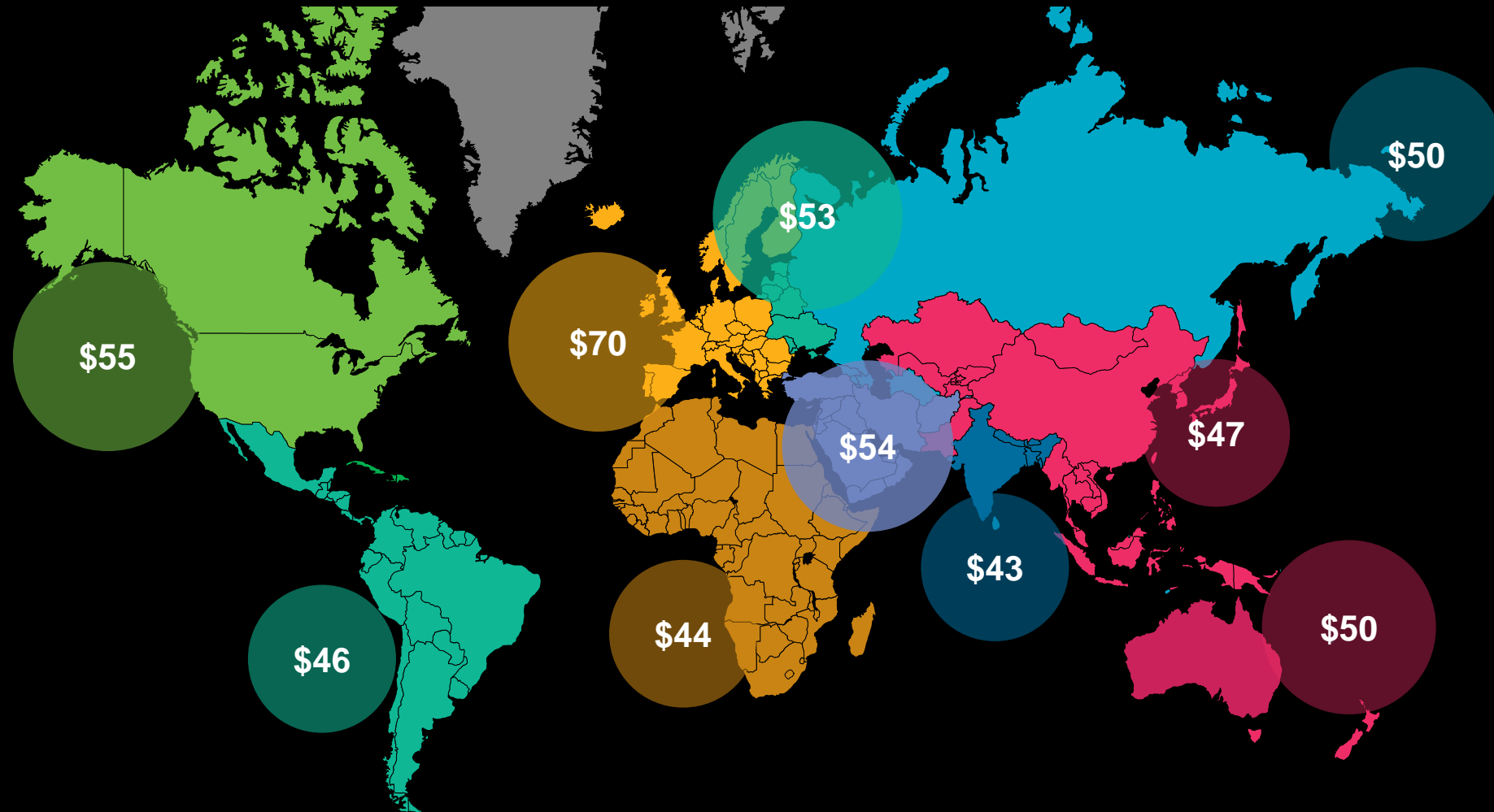


## Main factors inhibiting use of USM

*Weighted average of rankings (highest to lowest ranking, scale of 1–3) (amongst yes responses)*



# Wages in Asia remain competitive relative to W. Europe, but the gap is narrowing

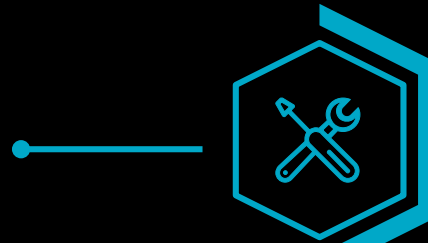


1. Average estimate of current prevailing technician billed airframe rates for heavy airframe maintenance by region (in US\$)

# 3 | Cybersecurity

Every day and across every facet of life, hackers are increasingly bolstering capabilities to launch cyberattacks and disrupt industries

Nature of cyber threats has evolved drastically over just the past decade



Hackers use a variety of means to achieve a number of ends

Experts place the number of expert, professional hackers at over 300,000 globally

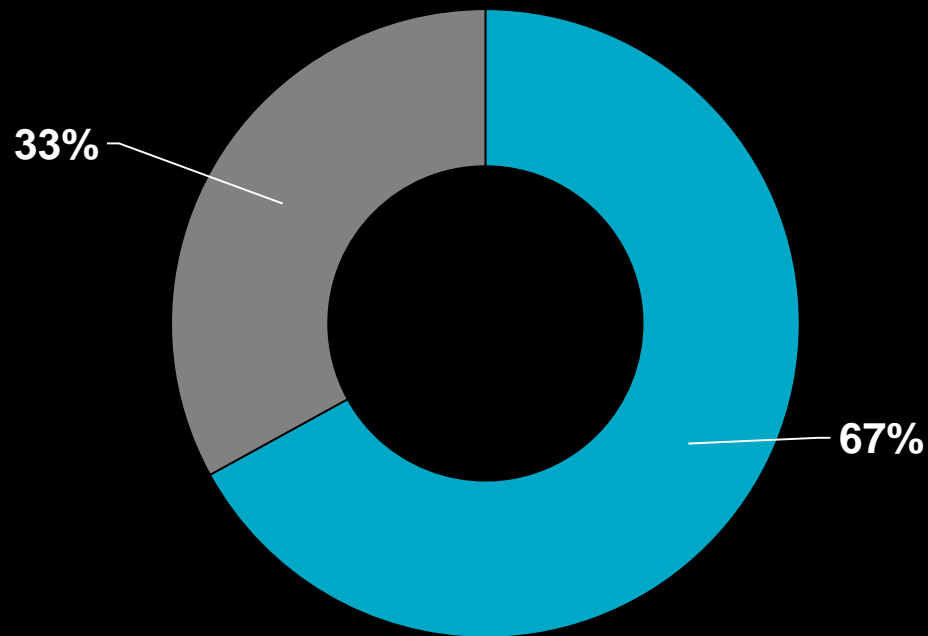


Global counter-hacking efforts and actual damages are estimated at half a trillion US\$ annually – a sum that has been increasing every year

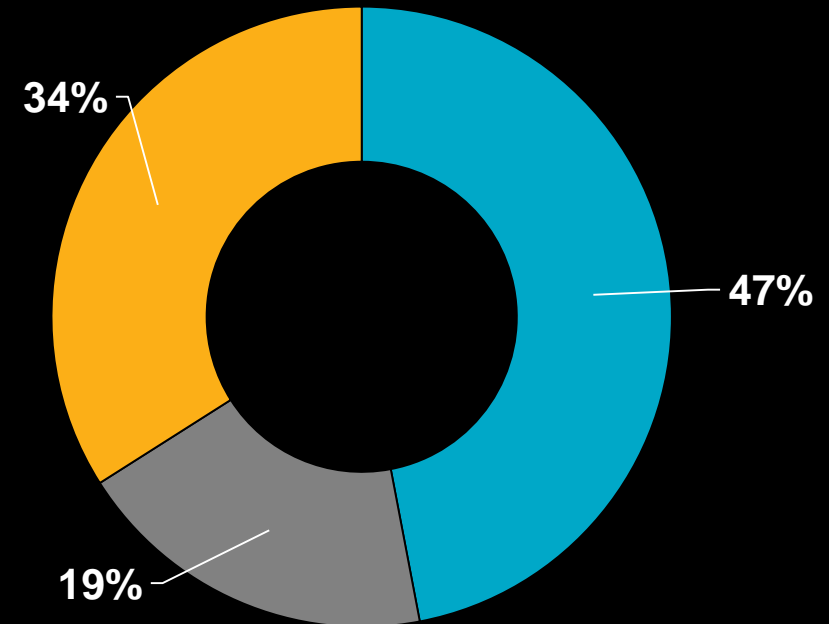


67% of respondents indicate they believe that their companies are prepared, yet less than half had conducted a review of cybersecurity risk in operations and maintenance in 2017

Is your company well prepared to handle cybersecurity threats related to operations and maintenance?



Has your company conducted a review of your cybersecurity risk in operations and maintenance in 2017?



Yes No Unknown

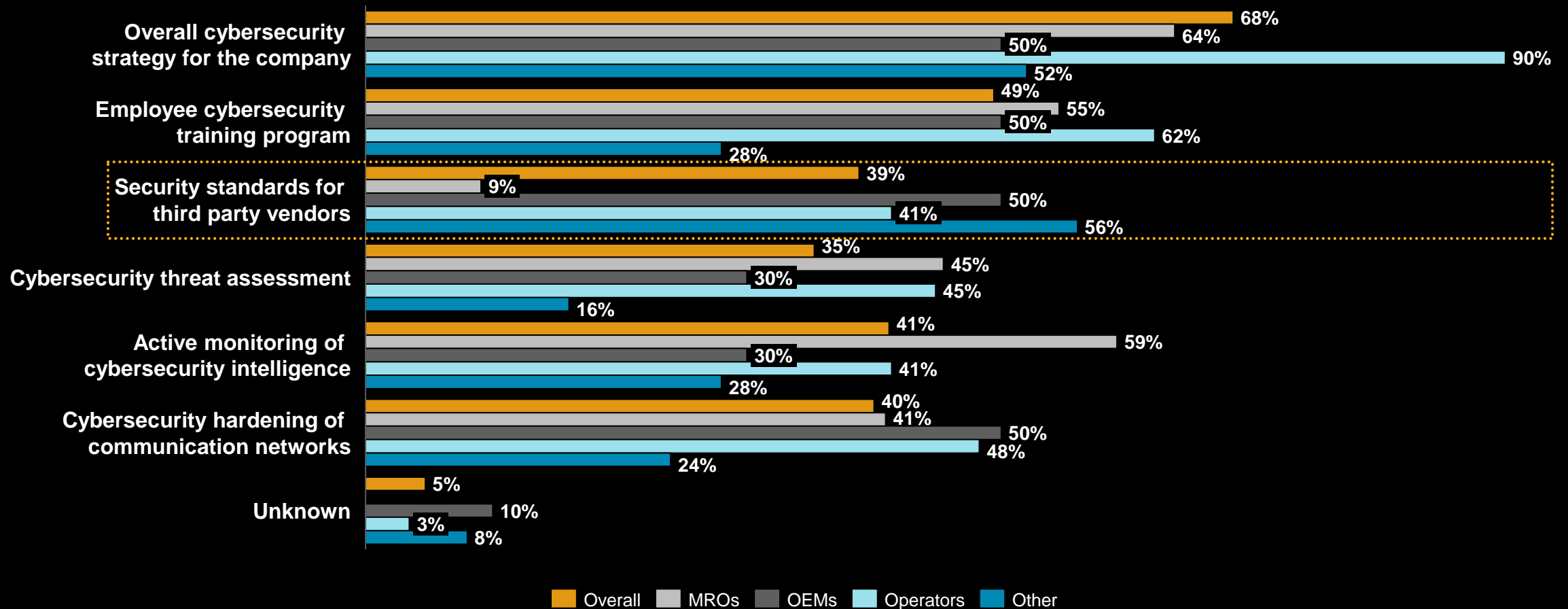
**The MRO industry  
has not yet had  
a major Target  
or Equifax level  
cyber-attack –  
are we next?**



While the majority of companies show an appropriately elevated level of concern, the survey also reveals considerable variability in levels of preparedness, which creates the potential for weak links in the supply chain

### Which cybersecurity safeguards has your company implemented?

*% of total respondents who selected each response for each segment*





To achieve a comprehensive, unified cybersecurity and risk management approach for the industry, MRO providers should consider a comprehensive approach

- 1**  **Evaluate current state cyber security programs to identify areas of improvement**
- 2**  **Develop a clear framework for mitigating and managing cyber risks**
- 3**  **Fortify information technology systems and create a security-minded culture across companies**
- 4**  **Build and enhance a security minded culture and be fully prepared for when a major cyber incident happens**

While no solution is guaranteed to avert all attacks, developing a shared, holistic approach to cybersecurity risk management may give companies a huge advantage

## 4 | Conclusions

# Conclusions

The global MRO business is currently valued at \$77 BN and is anticipated to reach \$115 BN by 2028

OEMs are expected to continue their push into MRO services and anticipated to hit or come close to meeting their growth ambitions



At the same time, MROs continue to battle higher material and labor costs

- There are no easy answers
- MROs will need to use a number of countermeasures to become more efficient

Further complicating matters, cyber threats are mounting and causing increasing disruption across industries

- The MRO industry has significant work to do to ensure they are well-prepared to mitigate and manage cyber risks

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